SERVICE MANUAL

PLUG-IN UNIT FOR MW910A

MH937A/MH938A/MH939A/MH955A

ANRITSU CORP.

1986.10 x 200 NIII-3(Y)
Printed in Japan

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Preface

This is the service manual for the MH937A, MH938A, MH939A, and MH955A.

For operating instructions, refer to the separate operation manual (OPERATION MANUAL OPTICAL TIME DOMAIN REFLECTOMETER MW910A AND PLUG-IN UNITS MH937A, MH938A, MH939A, MH955A).

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SECTION 1

GENERAL

1.1 Introduction

This service manual describes the repair and adjustment of the MW910A plug-in units.

Section 2 describes how to disassemble and reassemble the plug-in units, and the internal configuration.

Section 3 describes how to troubleshoot and repair when a problem occurs during measurements or when abnormalities are detected during performance checks.

Section 4 describes how to adjust the plug-in units after repair of performance checks.

Section 5 describes the circuit parts lists and how to order replacement parts.

Refer to the MW910A service manual during service.

1.2 Safety Precautions

WARNING

The plug-in units use a laser diode as the light source. Do not look directly into the laser radiation emitted from OUTPUT.

A OUTPUT connector protective cover is provided to protect the operator. A safety circuit is also installed to prevent emittance of laser radiation until the optical fiber connector is connected.

Cautions:

1. Insert or remove the plug-in unit only when the MW910A POWER switch is set OFF. And confirm that the plug-in unit is locked after mounting it.
2. Always ground the ground terminal (⏚) on the rear panel to prevent accidental electric shock.
3. Do not touch or insert metal items into the connectors in the plug-in unit when the power switch is on.
4. Do not plug the power cord into the ac outlet when the power switch is on.
5. Ensure that the ac line voltage is the same as that set by the VOLTAGE SELECTOR switches on the rear panel of the MW910A. Also confirm that the correct fuse is being used (refer to the MW910A Operation Manual).

SECTION 2

MECHANICAL CONFIGURATION

2.1 Introduction

Table 2-1 lists the mechanical parts. Figure 2-1 through 2-6 show disassembled views of the plug-in unit.

2.2 Precautions

Always follow the procedure steps below before disassembly and reassembly.

Step	Procedure
1	Turn off the MW910A power switch.
2	Unplug the plug for the ac outlet.
3	Remove the plug-in unit from the MW910A mainframe.

Failure to follow this safety procedure may cause fire and electrical shock hazards that could result in personal injury.

Table 2-1 Mechanical Parts List

Figure No.	Parts No.		Description	Remarks	Qty
Fig. 2-1	(1)	W22B830	Cover (1)		1
	(2)	W2B832	Cover (2)		1
Fig. 2-2	(3)	W39U2815A	Optical Output		1
	(4)	W4B8350	Plate		1
	(5)	W4B8351	Mesh		1
	(6)		Screw	3HRPS32S3	4
	(7)	W23B828	Shielding Plate		1
	(8)	W49H8932A	Lock		1
Fig. 2-3	(9)	W4H8749	Lock Knob		1
	(10)	34E73722	Knob		1
	(11)	442E80831A	Button		1
	(12)	W42B8336	Angle		1
	(13)	W4Z4304	FC Adaptor		1
	(14)	W4Y9839A	Cable	MH937A/MH938A/ MH939A	1
	(15)	W4Y9839B	Cable	MH955A	1
	(16)	W4B8342	Cover		1
	(17)	W32B3364	Case		1
	(18)	W23E696	Cord Winder		1
Fig. 2-4	(19)	W49H5630A	Connector Cap		1
	(20)	W4B7039	Plate		1

Table 2-1 Mechanical Parts List (Continued)

Figure No.	Parts No.		Description	Remarks	Qty
Fig. 2-5	(21)	W42B6916	Bottom Cover		1
	(22)	W42B6915	Side Cover		1
	(23)	44Z79621U	Spring		1
Fig. 2-6	(24)	W42B6917A	Angle		1
	(25)	W4B6919A	Plate		1
	(26)	W4Z4304	FC Adaptor		1
	(27)	W43B9154	Block		1
	(28)	W3H2919	Connector Cap		1

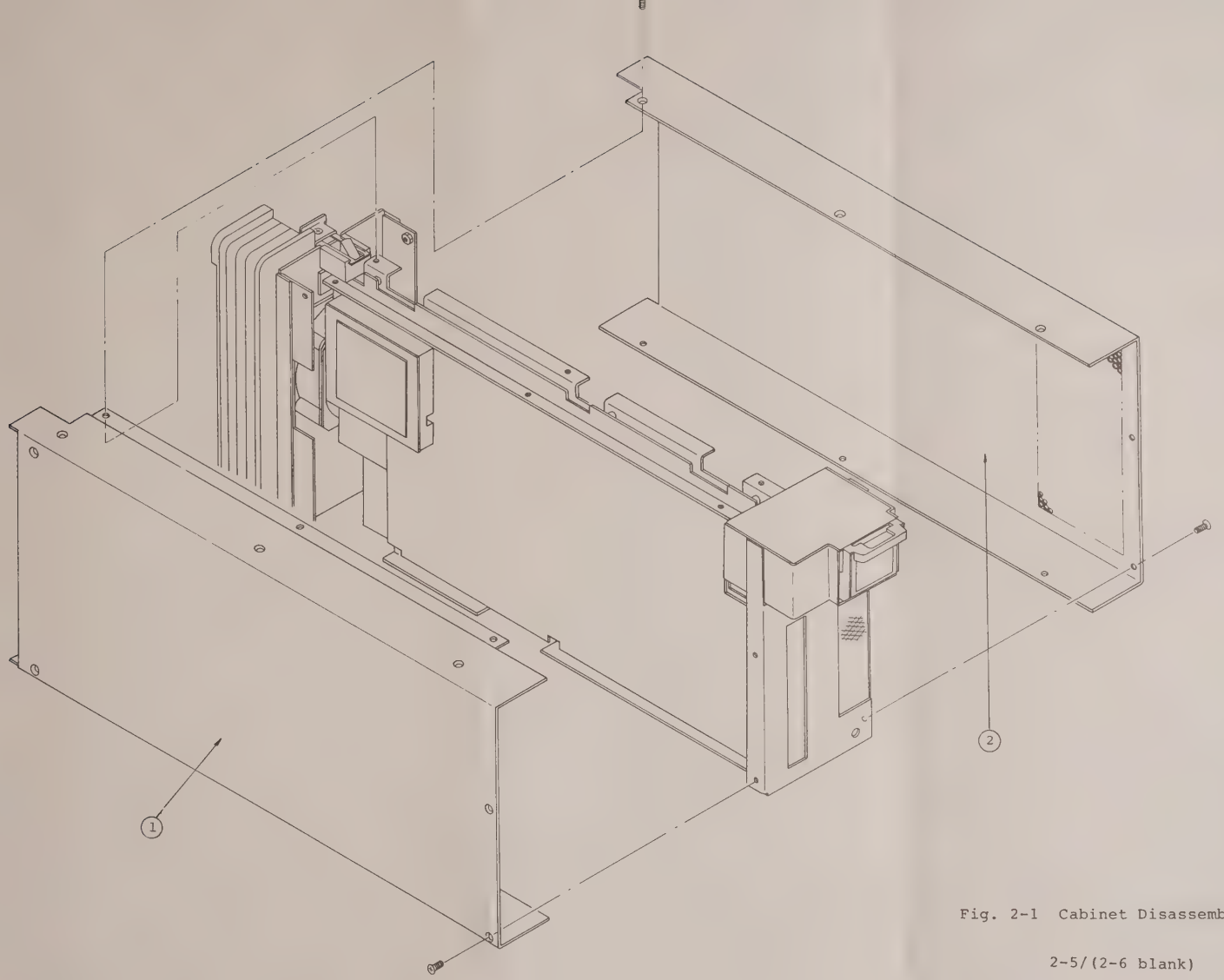


Fig. 2-1 Cabinet Disassembly

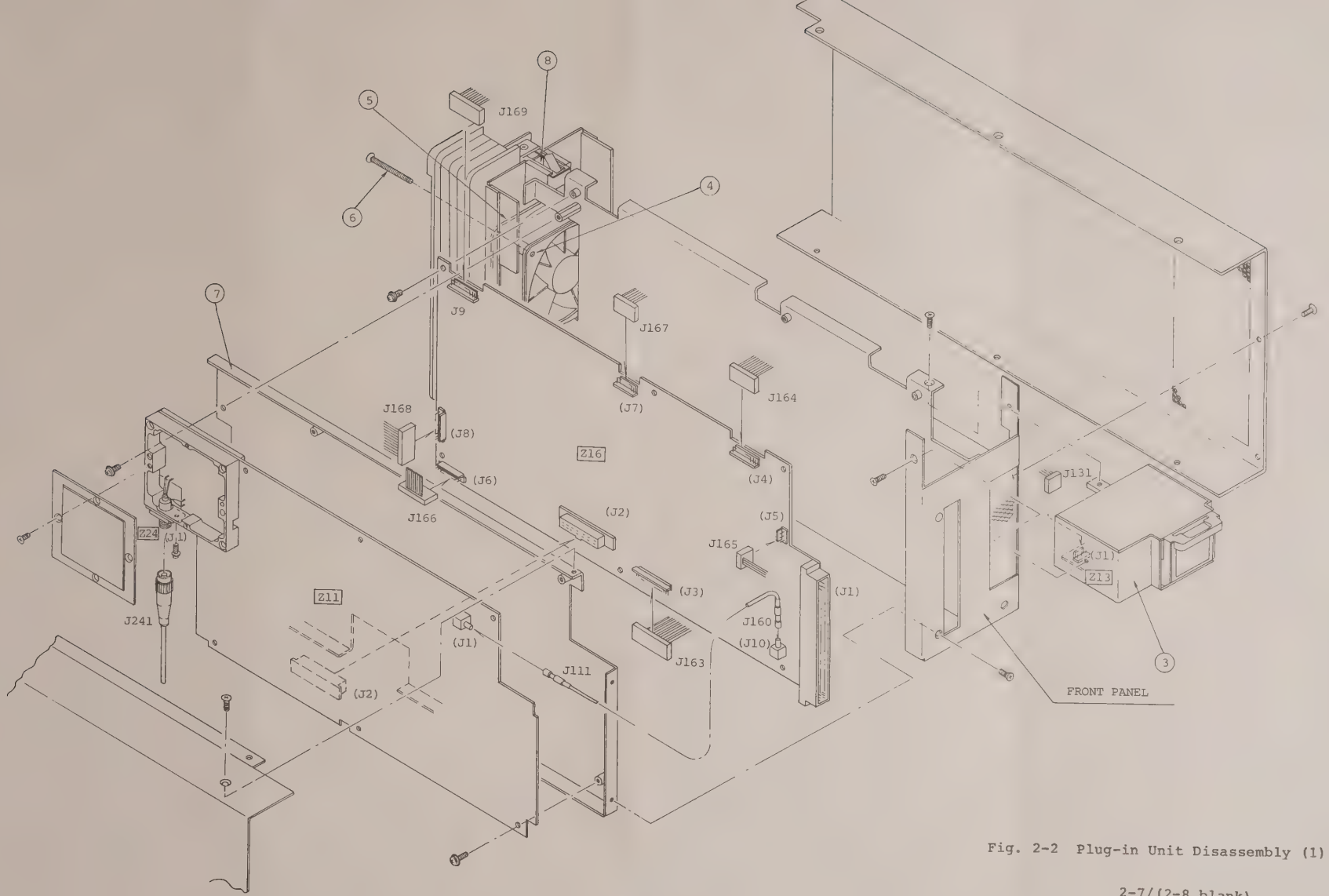


Fig. 2-2 Plug-in Unit Disassembly (1)

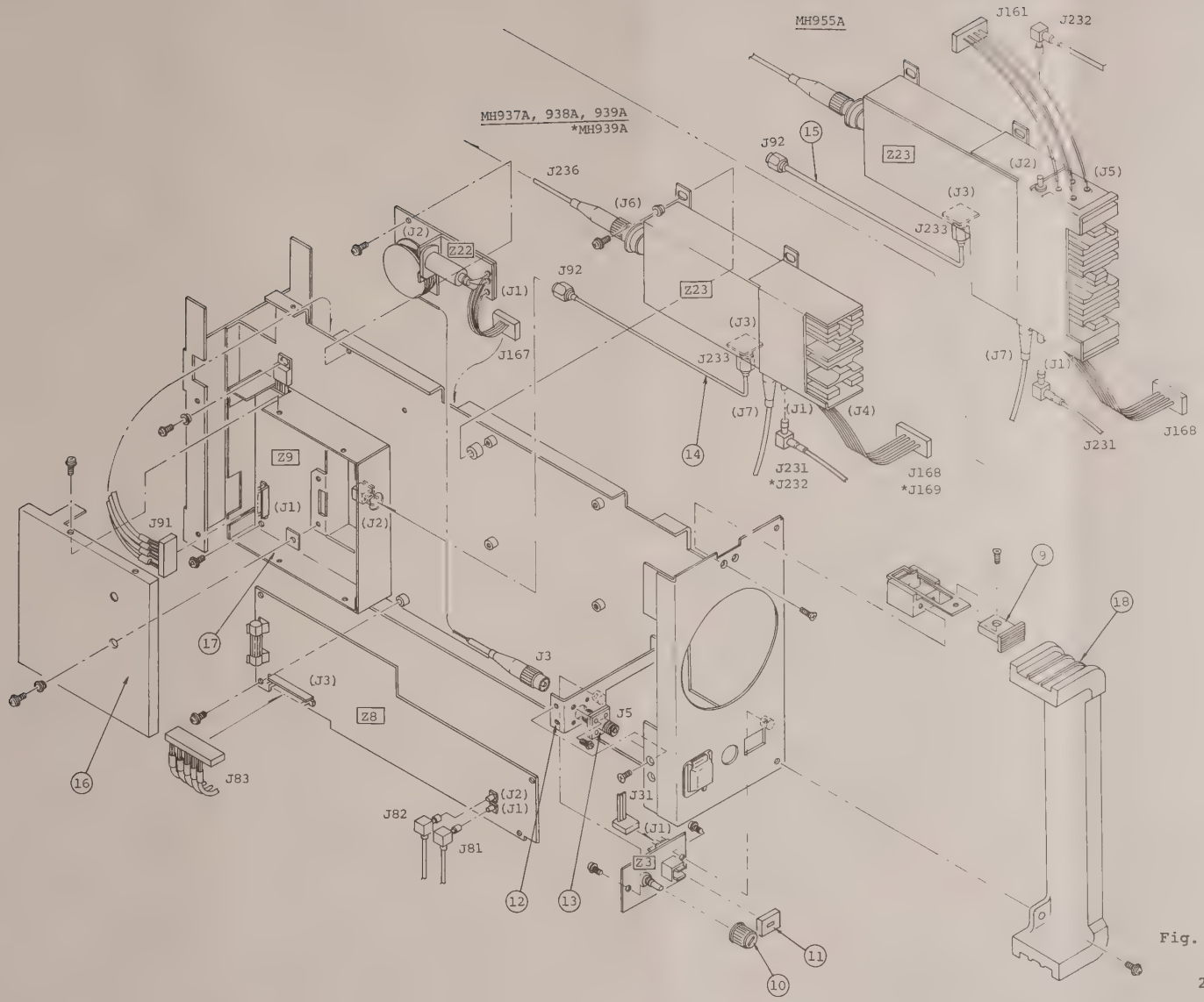


Fig. 2-3 Plug-in Unit Disassembly (2)

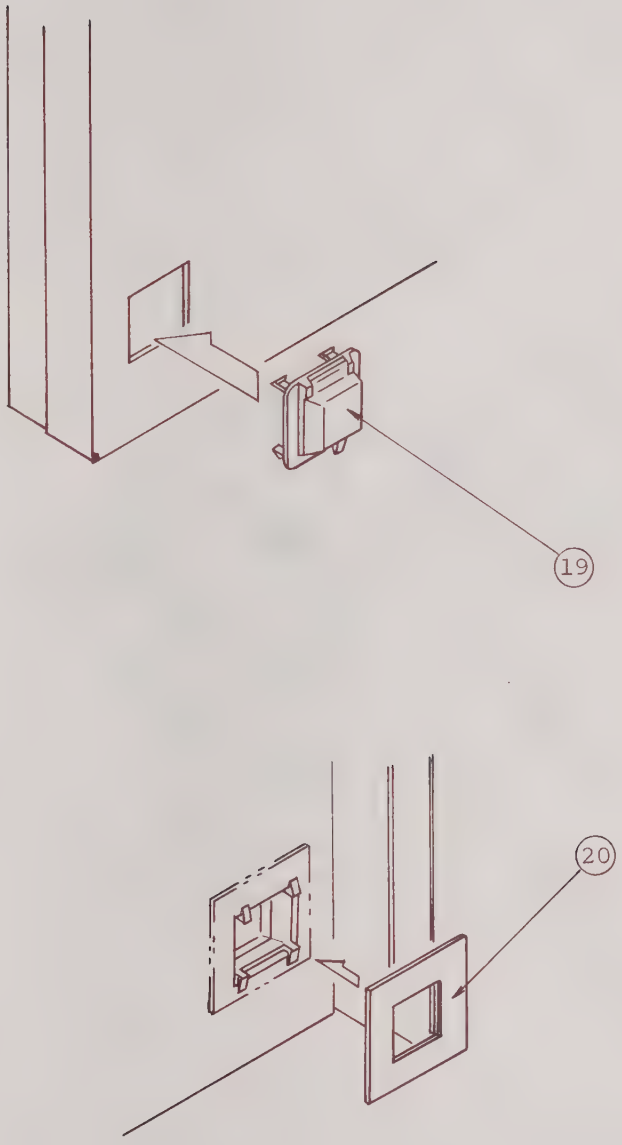


Fig. 2-4 Connector Cap Assembly

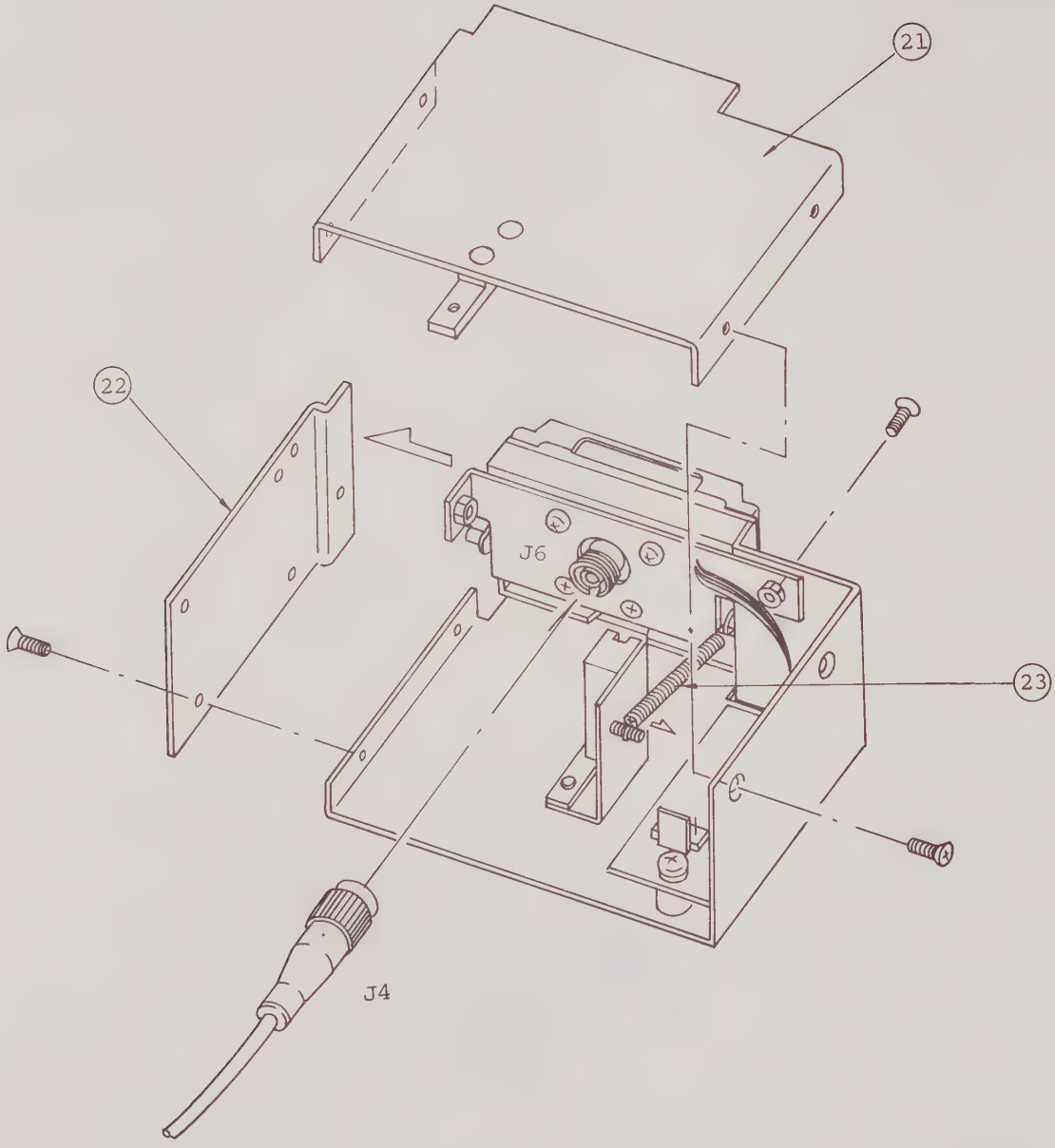


Fig. 2-5 Optical Output Disassembly (1)

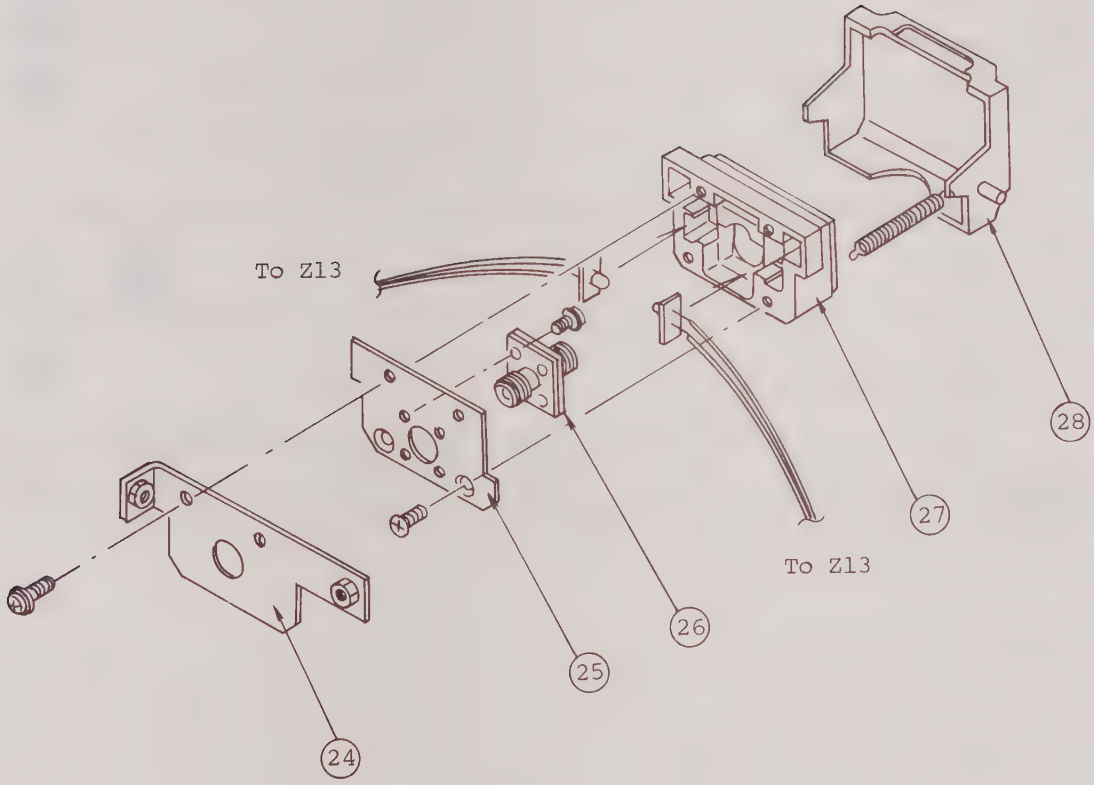


Fig. 2-6 Optical Output Disassembly (2)

2.3 Cabinet Disassembly

2.3.1 Cover removal (See Fig. 2-1.)

Remove the flat-head screws at the top, bottom, and sides of the plug-in unit and remove covers (1) and (2).

2.3.2 Shielding plate removal (See Fig. 2-2.)

Step	Procedure
1	Disconnect Z11-J1 & J111, and Z24-J1 & J241.
2	Remove the two flat-head screws on the front panel.
3	Remove the one oval-head screw on the shielding plate (7).

2.4 Circuit Reference

The plug-in unit PC boards are differentiated with Z numbers, such as Z3, or Z8. Table 2-2 lists circuit diagram numbers, circuit names, Z numbers, and PC board numbers.

Table 2-2 Circuit Reference

Circuit Diagram No.	Names	Z No.	PC Board No.
1	Plug-in Unit Overall Circuit Diagram	———	———
2	KEY-2	Z3	W4U6693
3	LD DR	Z8	W22U684
	AO DR	Z9	
4 to 10	AMP	Z11	W22U0671
11	Optical Connector Sensor	Z13	W42U6695
12 to 18	Unit Motherboard	Z16	W22U824

SECTION 3

TROUBLESHOOTING AND REPAIR

3.1 Introduction

This section describes the troubleshooting and repair methods. It also describes the test equipment, parts check method, soldering precautions, etc. that are necessary when troubleshooting and repairing.

3.2 Check and Parts Replacement

3.2.1 Identification marks on PC boards

As shown in Fig. 3-1, PC boards have the unit No., PC board No. with the revision No., PC Board Name, part No. and test points with the test point names.

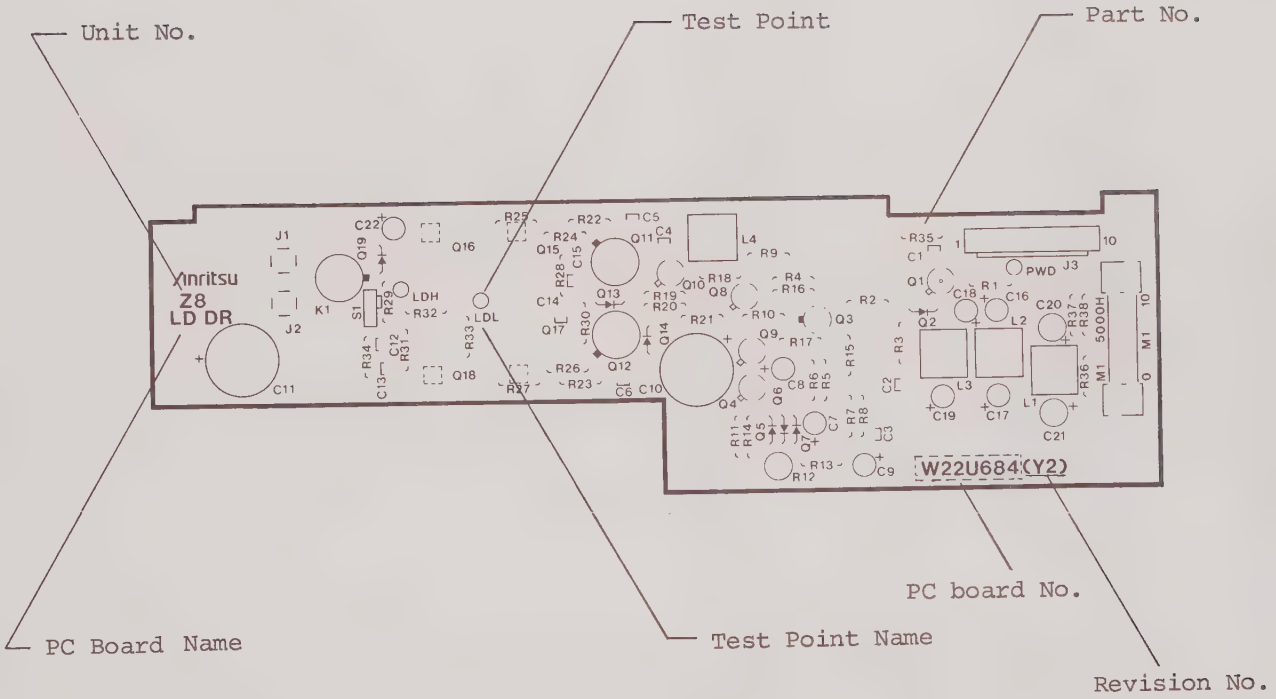


Fig. 3-1 Identification Marks on PC Boards

3.2.2 Notes on soldering and removing components

1. Use an 30- to 40-watt pencil-type insulated soldering iron. If it is not an insulated type, it may damage the part.

2. When removing a soldered component from a PC board or soldering in a new component, nip the component lead with tweezers to shunt heat.

3. Major component lead tips are bent behind the PC board to ensure secure support. To remove the component, first lift up the lead tips and then remove the component.

3.2.3 Transistor and diode checks

(1) Checking transistors mounted on the PC board

Transistors can be checked in the operating state by measuring the base and emitter potentials. In NPN-type silicon transistors, the base potential is 0.6 or 0.7 V higher than the emitter potential. However, the PNP-type silicon transistors have a base potential that is 0.6 or 0.7 V lower than the emitter. Transistors are faulty if these characteristics are not satisfied.

(2) Checking transistors removed from the PC board

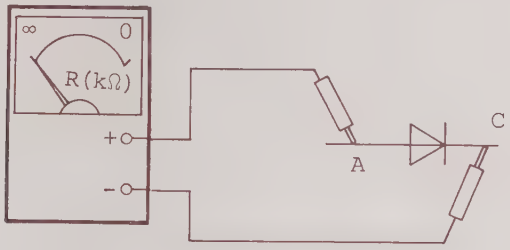
Transistors can be checked by measuring the resistance values between the emitter, base, and collector using an ohmmeter. Reference values are given in Table 3-1. Note that this check should be performed at a measuring current of less than 100 μA.

Table 3-1 Testing Transistors Removed from the PC board

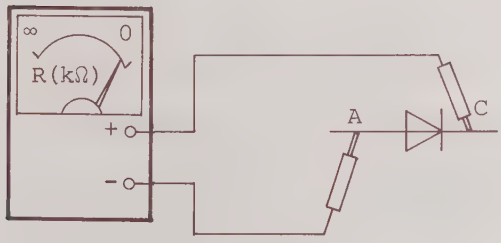
Transistor Type	Ohmmeter Connection		Resistance (Reference)
	Positive lead	Nagative lead	
PNP	Emitter, or Collector	Base	1 to 10 kΩ
	Emitter	Collector	Very high
NPN	Base	Emitter, or Collector	1 to 10 kΩ
	Emitter	Collector	Very high

(3) Checking diodes removed from PC board

Diodes can be checked by measuring the resistance between the A (anode) and C (cathode), and vice versa. If the resistance between A and C is high and the resistance between C and A is low, as shown in Fig. 3-2, the diode is normal.



(1) Between A and C



(2) Between C and A

Fig. 3-2 Diode Check

For 1S953 as an example, between A(+) and C(-): ∞
between C(+) and A(-): ≒ 9 kΩ

3.3 Recommended Test Equipment

Table 3-2 lists the recommended test equipment for troubleshooting.

Table 3-2 Recommended Test Equipment

No.	Instrument and Device	Required Specifications	Remarks
1	Digital Multimeter	Measuring voltage range: 0 to ±100 Vdc	
2	Oscilloscope	Frequency range: Dc to 300 MHz	
3	50 Ω Terminator	50 Ω	
4	20 dB Electronic Attenuator	20 dB	
5	BNC-OSM Cord		A cord with BNC and OSM Connectors
6	Optical Power Meter with Optical Sensor	Wavelength: 0.75 to 1.8 µm Measuring range: -55 to 0 dBm	Anritsu ML93A and MA913A
7	Optical Attenuator	1.3 µm/1.5 µm band Single-mode fiber Maximum attenuation: 65 dB	Anritsu MN924A
		1.3 µm band Graded-index fiber Maximum attenuation: 65 dB	Anritsu MN95B
8	Optical Fiber Cable 1	Single-mode fiber $\geq$5 km	
		Graded-index fiber $\geq$5 km	
9	Optical Fiber Cable 2	Single-mode fiber 1 to 2 m	
		Graded-index fiber 1 to 2 m	

Table 3-2 Recommended Test Equipment (Continued)

No.	Instrument and Device	Required Specifications	Remarks
10	Waveform Monitor	Wavelength: 1.0 to 1.6 µm	Anritsu MP96A
11	Stabilized Light Source	Wavelength: 1.3 µm Laser diode	Anritsu MG921A
		Wavelength: 1.55 µm Laser diode	Anritsu MG923A
12	Ohmmeter		
13	Coaxial Cord		A 1.5 D cord with 27 DP plugs

3.4 Service Kit

For each plug-in unit, two extender cables shown in Table 3-3 are available.

Table 3-3 Service Kit

No.	Name	Remarks
1	Extender Cable 1	For MW910A and Plug-in Units connection
2	Extender Cable 2	For Z16 and Z11 connection

3.5 Block Diagram and Overall Troubleshooting

Before troubleshooting the plug-in unit, first troubleshoot the MW910A according to the MW910A Service Manual.

If the plug-in unit is assumed to be faulty, perform subsequent troubleshooting while it is connected to the MW910A with Extender Cable 1.

3.5.1 Block diagram

Figure 3-3 shows the plug-in units block diagram.

Each plug-in unit is composed of two modules LD/AO and LED, and six PC boards: Z3 KEY-2, Z8 LD driver, Z9 AO driver, Z11 AMP, Z13 optical-connector sensor, and Z16 unit motherboard.

The Z16 consists of I/O port, LED driver, and LD/AO timing generator. The I/O Port has Output Port circuit for plug-in unit and Input Port circuit to identify the type of plug-in unit.

The power sent from the MW910A is supplied to the plug-in unit through Z16 unit motherboard.

The Z16 relays signals between the plug-in unit and the MW910A.

The LED driver is the circuit which drives the LED light and makes a light pluse with a repetition period of 409.6 µs and duty of 50%.

The LD/AO timing generator generates timing pulses to drive the LD in Z8 and AO switch in Z9, using the trigger signal sent from the MW910A.

The light radiated from the LD module is output and injected to a test fiber. Backscattering light is returned through the fiber and is input to the APD module through the A/O switch.

The APD output is sent to Z11 AMP, which converts the output signal from current to voltage and amplifies it, and is transmitted to the MW910A through Z16 unit motherboard.

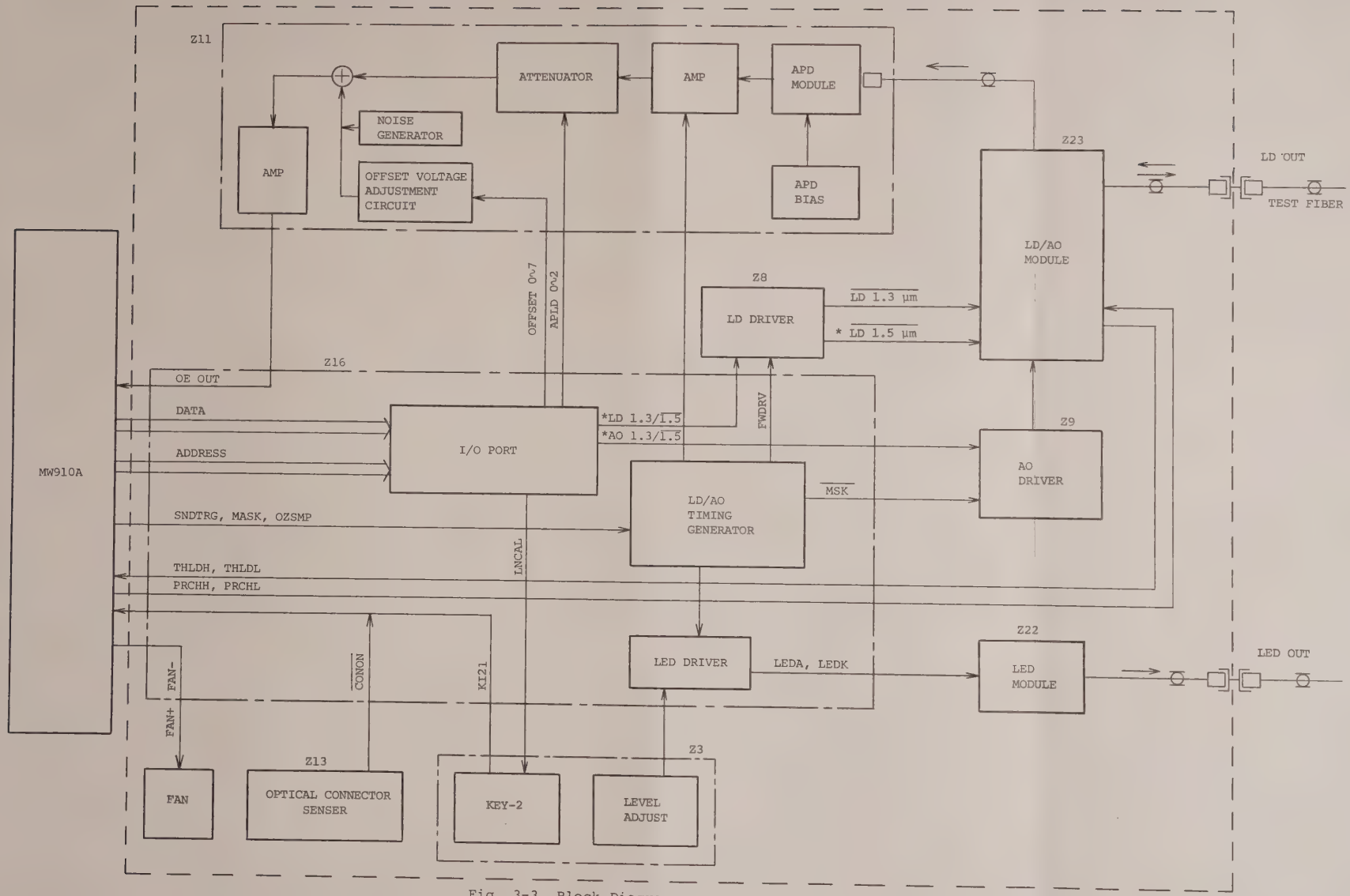


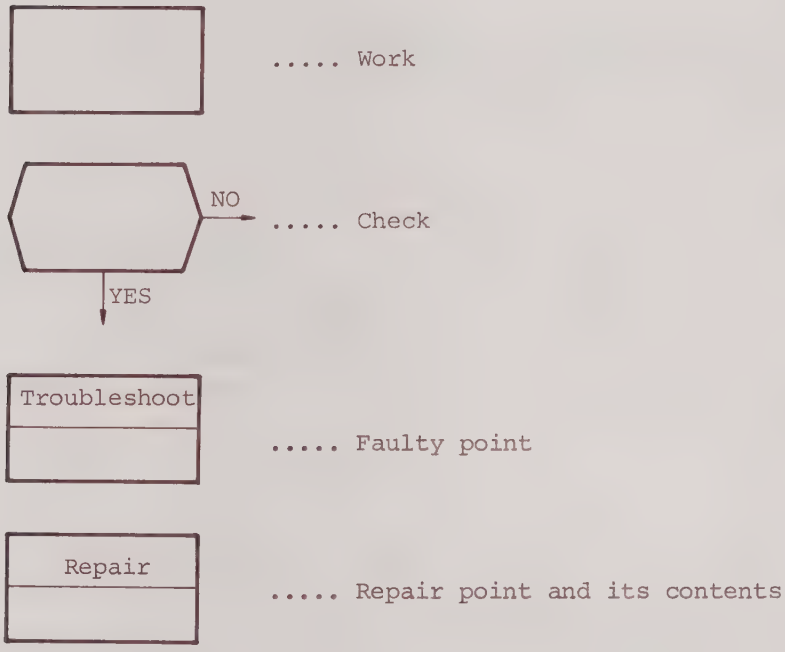
Fig. 3-3 Block Diagram

Note: Asterisk-indicate lines are signal lines for the MH955A only.

3.5.2 Overall troubleshooting and repair

(1) Flowchart symbols

The flowcharts in the section 3 use the symbols shown below to explain the troubleshooting procedure.



Note:

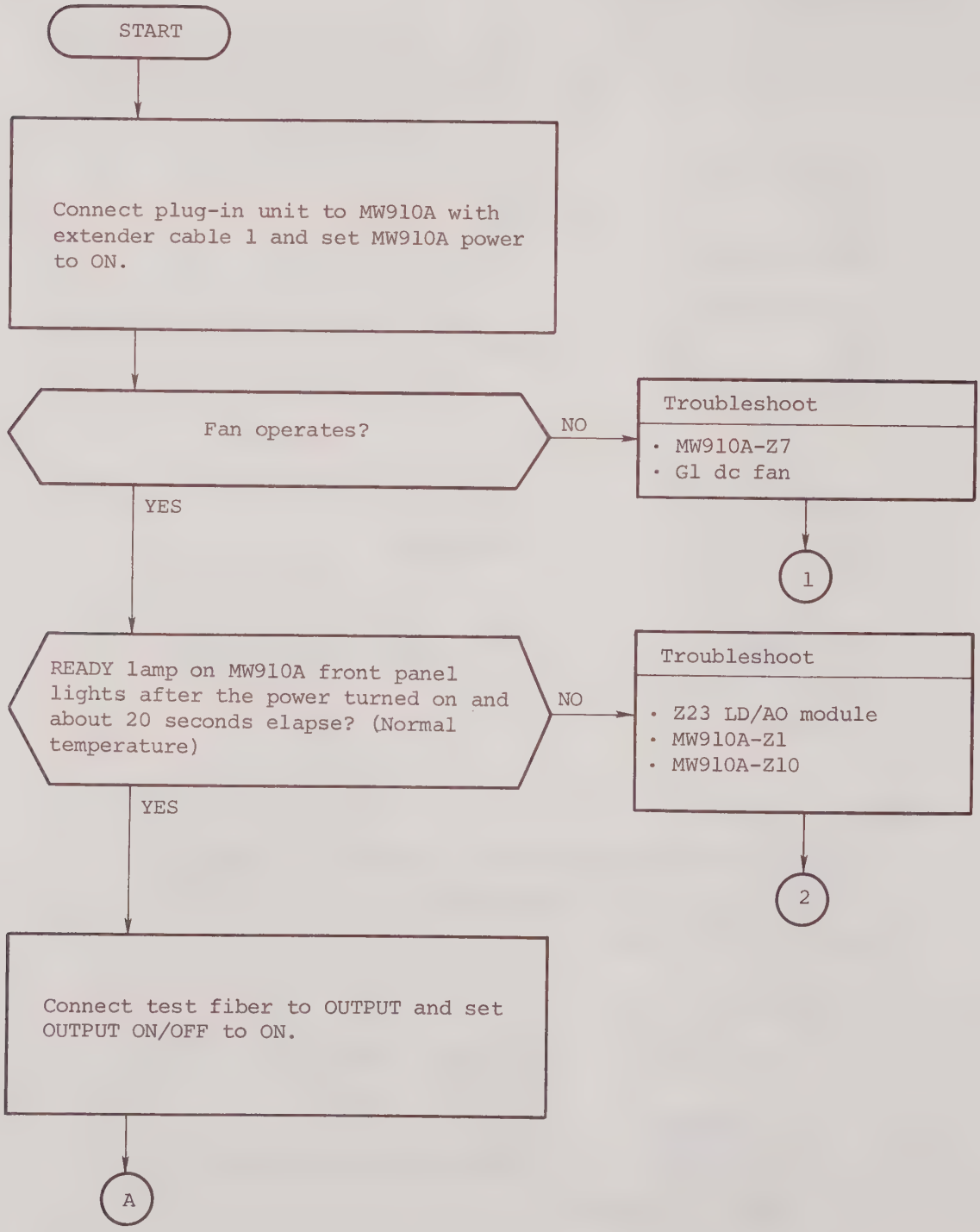
Explanations described below figures in side the ⬭ symbols are setting conditions for the MW910A and an oscilloscope.

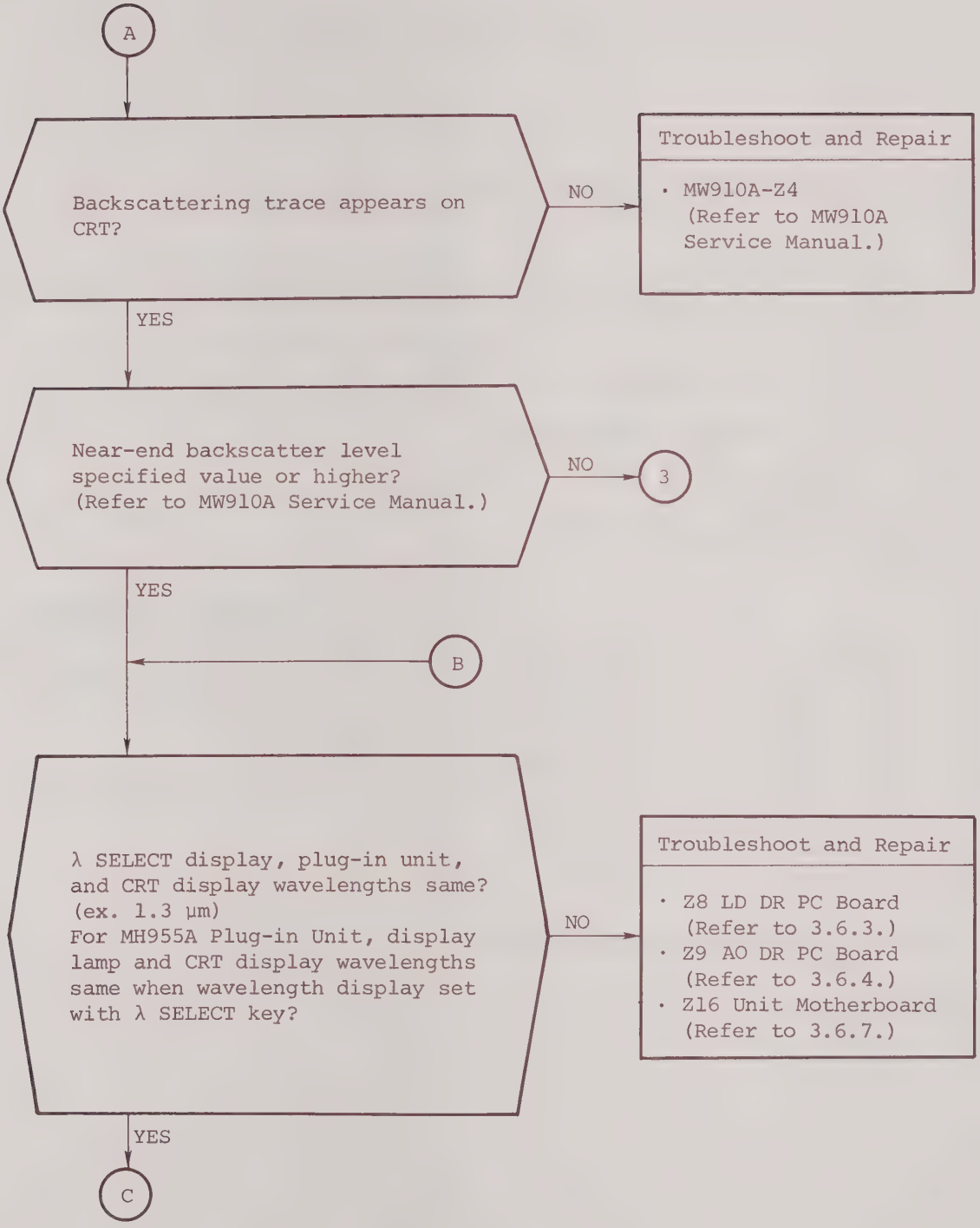
(Example)

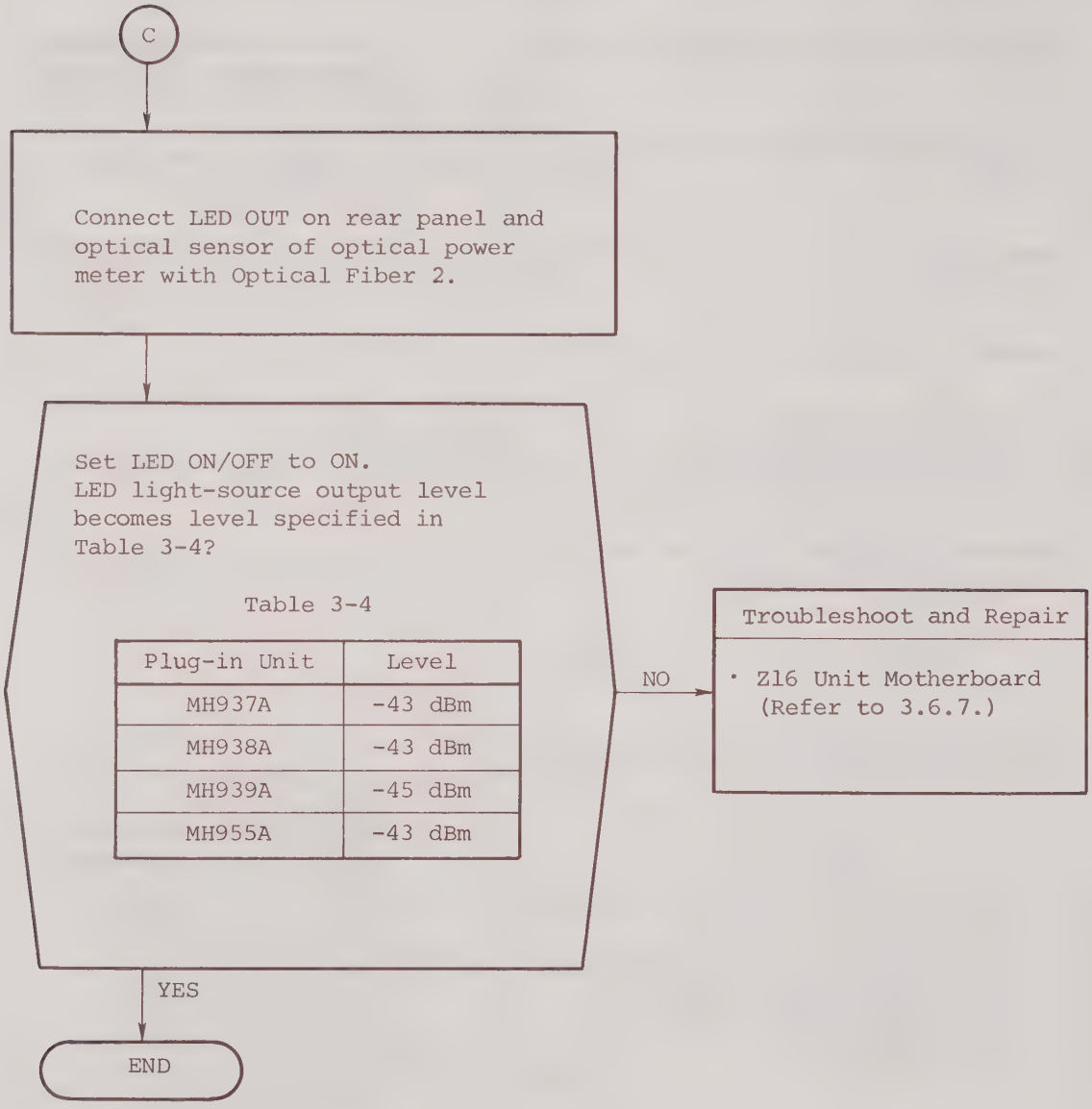
DR = 36 km — Distance Range 36 km (MW910A setting)

20 mV/div
50 µs/div
TRG = "SNDTRG"
} Oscilloscope settings

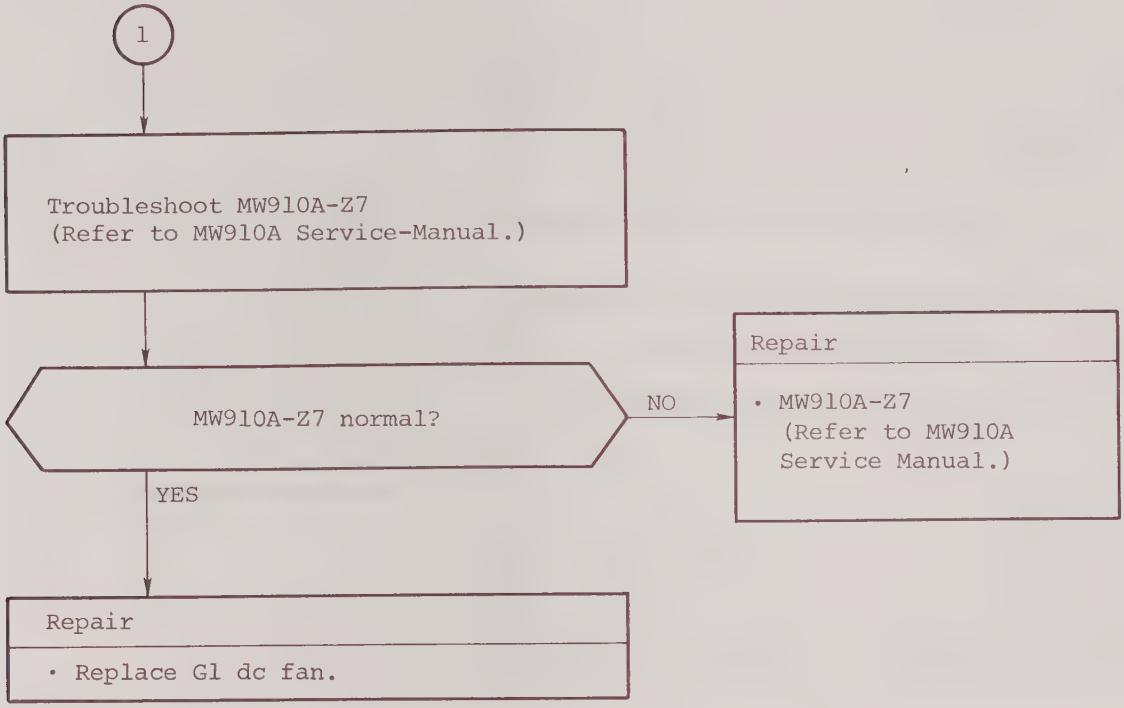
(2) Main flow of overall troubleshooting

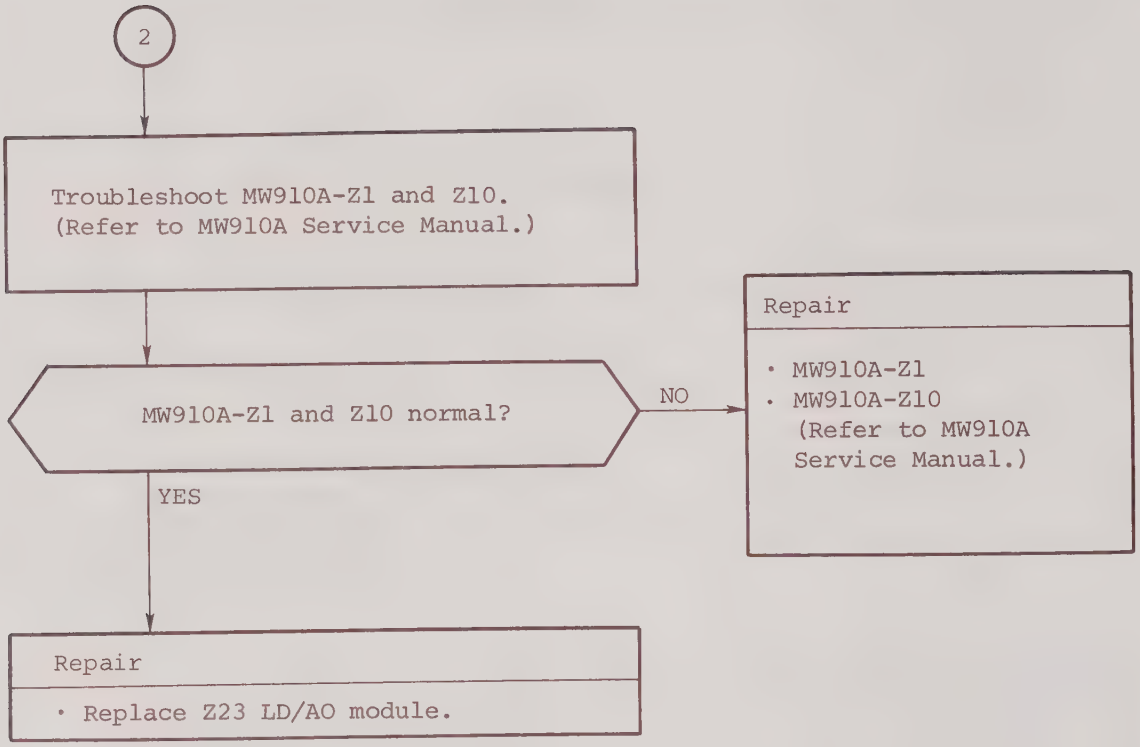


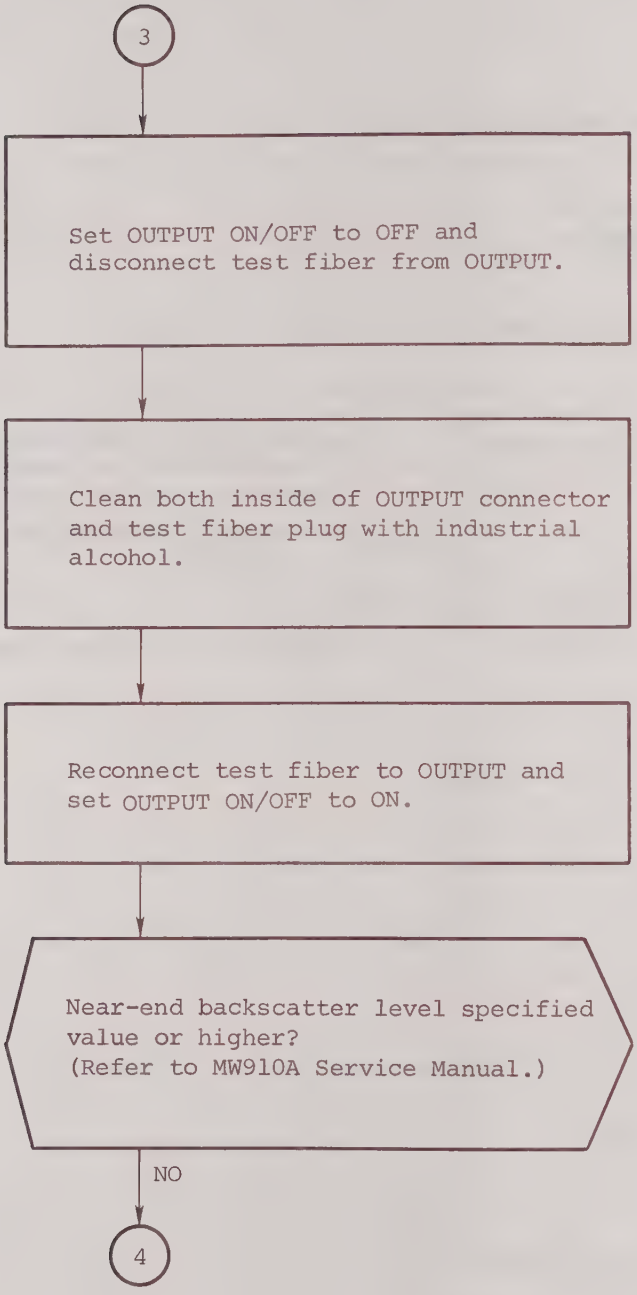

A
Backscattering trace appears on CRT?
NO
Troubleshoot and Repair
· MW910A-Z4 (Refer to MW910A Service Manual.)
YES
Near-end backscatter level specified value or higher? (Refer to MW910A Service Manual.)
NO
3
YES
B
λ SELECT display, plug-in unit, and CRT display wavelengths same? (ex. 1.3 μm) For MH955A Plug-in Unit, display lamp and CRT display wavelengths same when wavelength display set with λ SELECT key?
NO
Troubleshoot and Repair
· Z8 LD DR PC Board (Refer to 3.6.3.)
· Z9 AO DR PC Board (Refer to 3.6.4.)
· Z16 Unit Motherboard (Refer to 3.6.7.)
YES
C

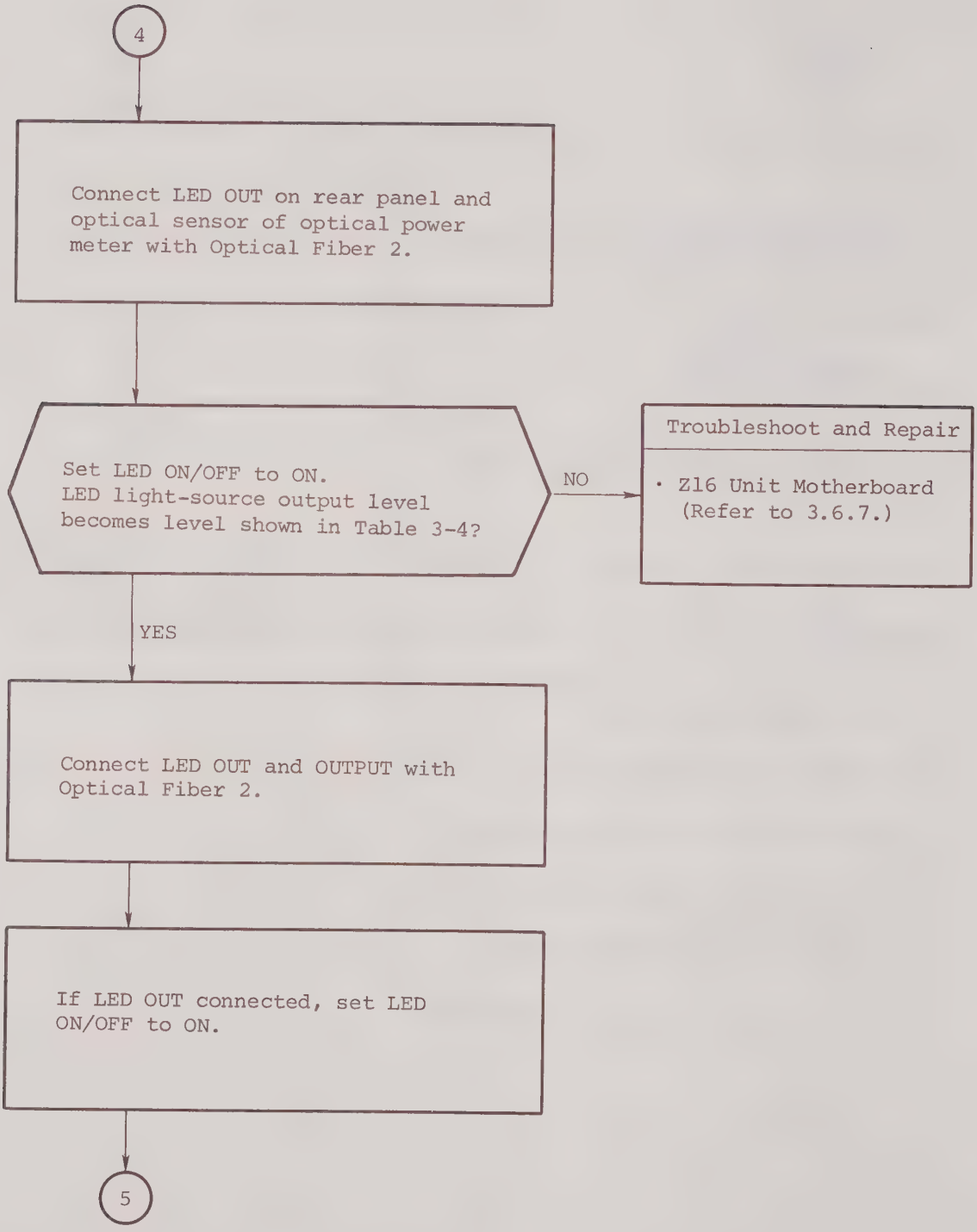

C
Connect LED OUT on rear panel and optical sensor of optical power meter with Optical Fiber 2.
Set LED ON/OFF to ON.
LED light-source output level becomes level specified in Table 3-4?
Table 3-4
Plug-in Unit
Level
MH937A
-43 dBm
MH938A
-43 dBm
MH939A
-45 dBm
MH955A
-43 dBm
NO
Troubleshoot and Repair
· Z16 Unit Motherboard (Refer to 3.6.7.)
YES
END

(3) Subflow of overall troubleshooting and repair




2
Troubleshoot MW910A-Z1 and Z10.
(Refer to MW910A Service Manual.)
MW910A-Z1 and Z10 normal?
NO
YES
Repair
• MW910A-Z1
• MW910A-Z10
(Refer to MW910A
Service Manual.)
Repair
• Replace Z23 LD/AO module.


3
Set OUTPUT ON/OFF to OFF and disconnect test fiber from OUTPUT.
Clean both inside of OUTPUT connector and test fiber plug with industrial alcohol.
Reconnect test fiber to OUTPUT and set OUTPUT ON/OFF to ON.
Near-end backscatter level specified value or higher? (Refer to MW910A Service Manual.)
NO
4


4
Connect LED OUT on rear panel and optical sensor of optical power meter with Optical Fiber 2.
Set LED ON/OFF to ON.
LED light-source output level becomes level shown in Table 3-4?
NO
Troubleshoot and Repair
· Z16 Unit Motherboard (Refer to 3.6.7.)
YES
Connect LED OUT and OUTPUT with Optical Fiber 2.
If LED OUT connected, set LED ON/OFF to ON.
5

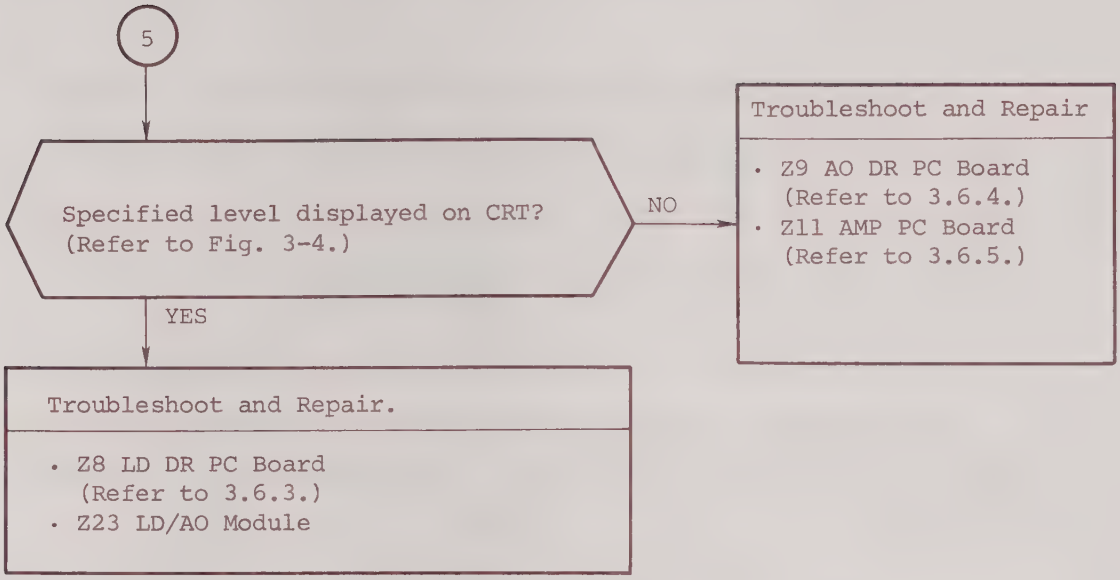


Fig. 3-4 Display Level in LED MODE Output

3.6 Circuit Description and Troubleshooting for Each PC Boards

3.6.1 Introduction

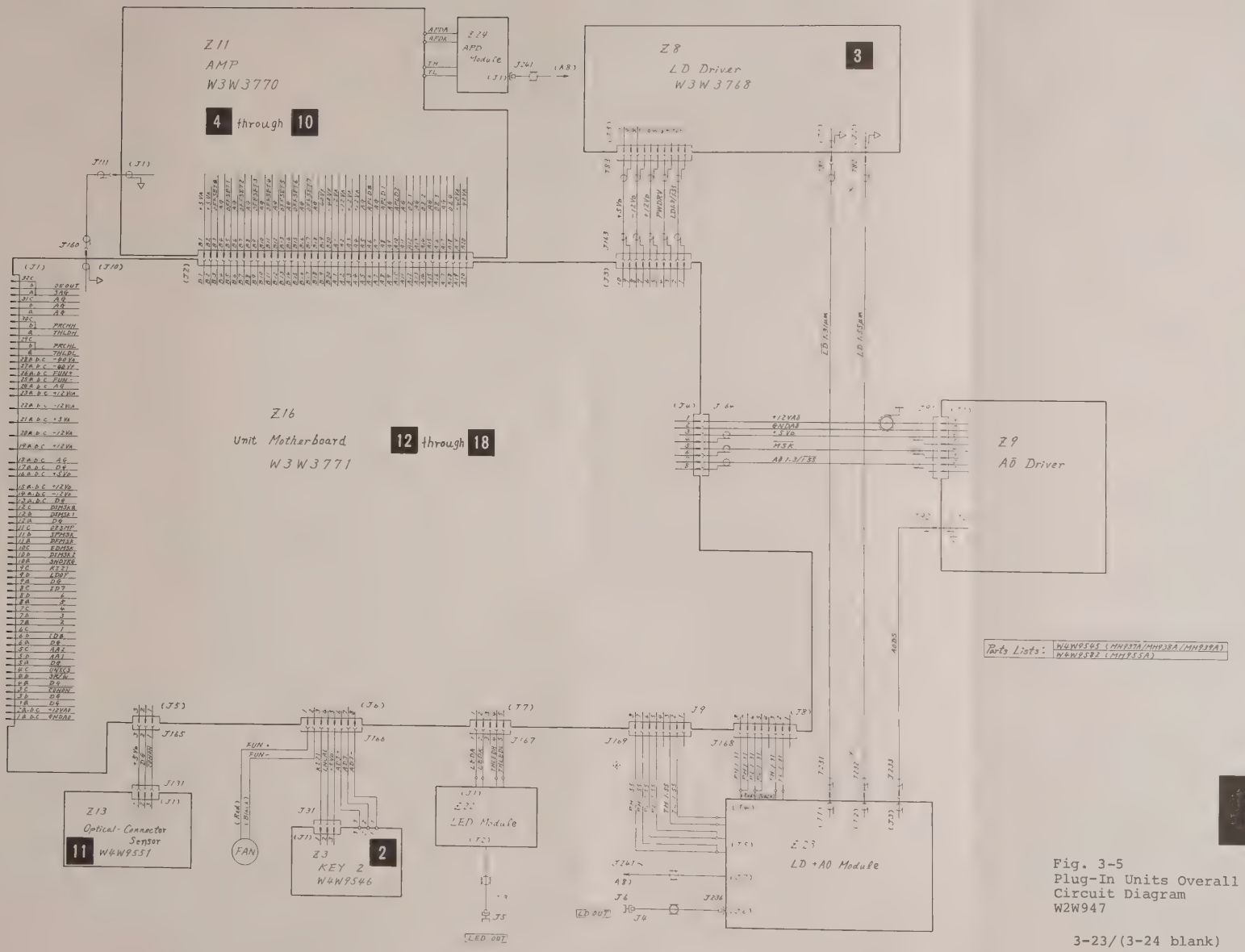
The plug-in units generate optical pulses by using a laser diode (LD). The optical pulses are supplied to the test fiber through the Acoustooptic (AO) switch. The back-scattered light and Fresnel reflection are received through the AO switch by the Avalanche Photodiode (APD), which converts the received light to electrical signals.

Refer to Fig. 3-5 Circuit Diagram of the plug-in unit.

In Sections 3 and 4, a voltage is represented as the logic level of the TTL or CMOS. So, refer to the voltage values shown in Table 3-5 below.

Table 3-5 Logic Levels and Voltages

Logic Level	TTL	CMOS
High	$\geqq$2.0 V	$\geqq$3.15 V
Low	$\leqq$0.8 V	$\leqq$1.3 V



1

Fig. 3-5
Plug-In Units Overall
Circuit Diagram
W2W947

3.6.2 Z3 KEY-2 PC Board

(1) Circuit description

This PC board consists of a key switch (S1), which turns the internal LED light-source on and off, and a variable resistor (R1), which adjusts the LED light-source output.

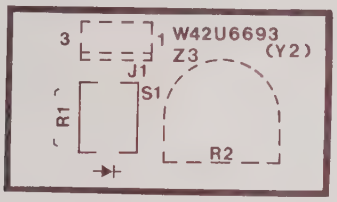
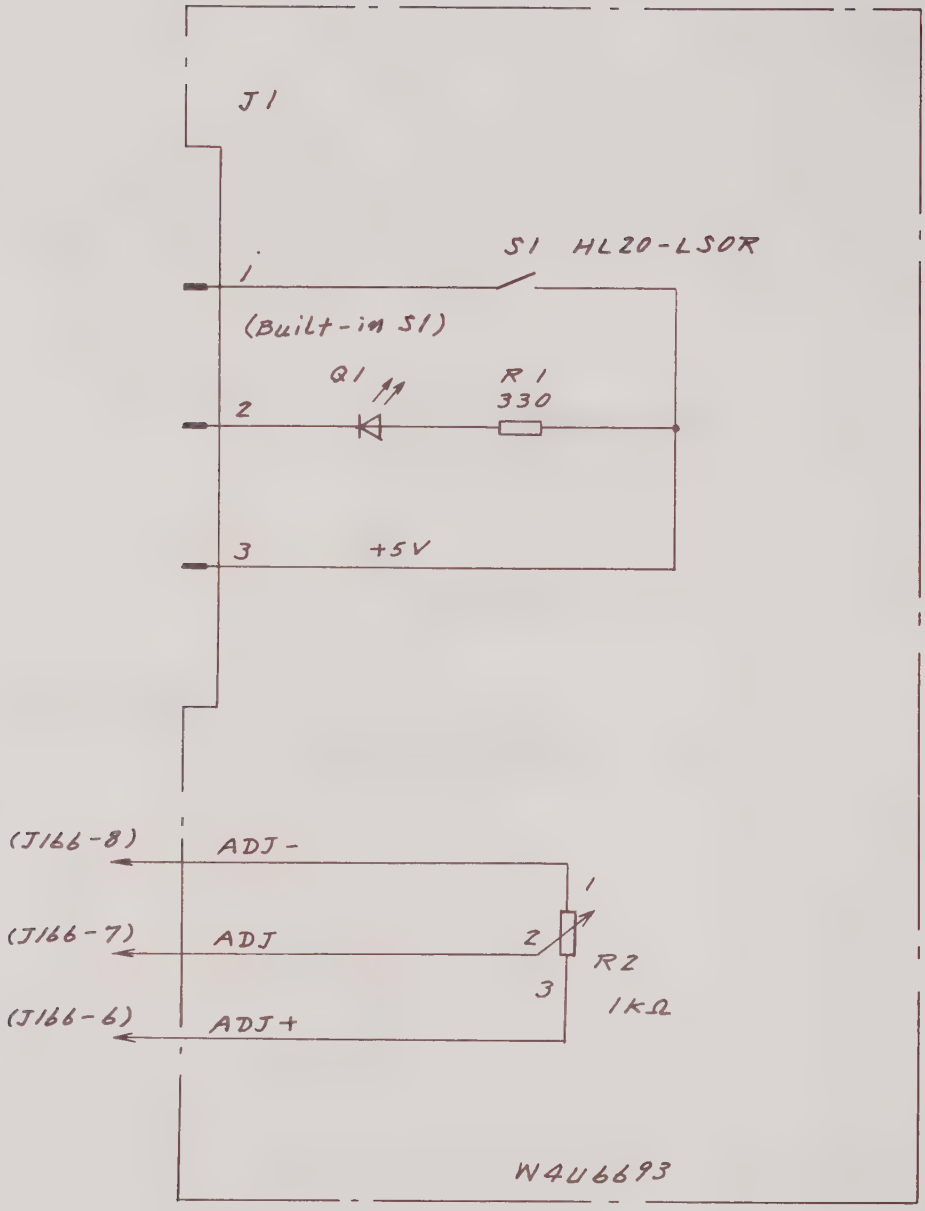


Fig. 3-6 Z3 KEY-2 PC Board Component Layout



Parts List	W4W9547

2

Fig. 3-7 Z3 KEY-2 Circuit Diagram
W4W9546 1/1

3.6.3 Z8 LD DR PC Board

(1) Circuit description

This PC board consists of a circuit for driving the laser diode (LD).

This circuit generates an approximately 400 mA current pulse by shaping and amplifying the trigger signal sent from the MW910A through the Z16 unit motherboard and drives the LD.

(2) Troubleshooting and repair

Setup:

Disconnect J81 & Z8-J1, and J82 & Z8-J2.

Are test point voltages:

❶ = +5.0 V,

❷ = -12.0 V,

❸ = +12.0 V, and

❹ = -12.0 V?

NO → 1

YES

Set OUTPUT ON/OFF to ON.
Waveform obtained at test point ❺ as shown in Fig. 3-8?

Z8

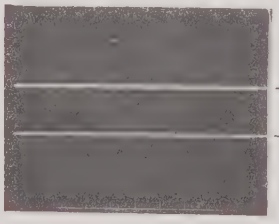


Fig. 3-8

DR = 36 km, (PW = 4 μs)

Both ❺, ❻ 2 V/div
0.1 ms/div

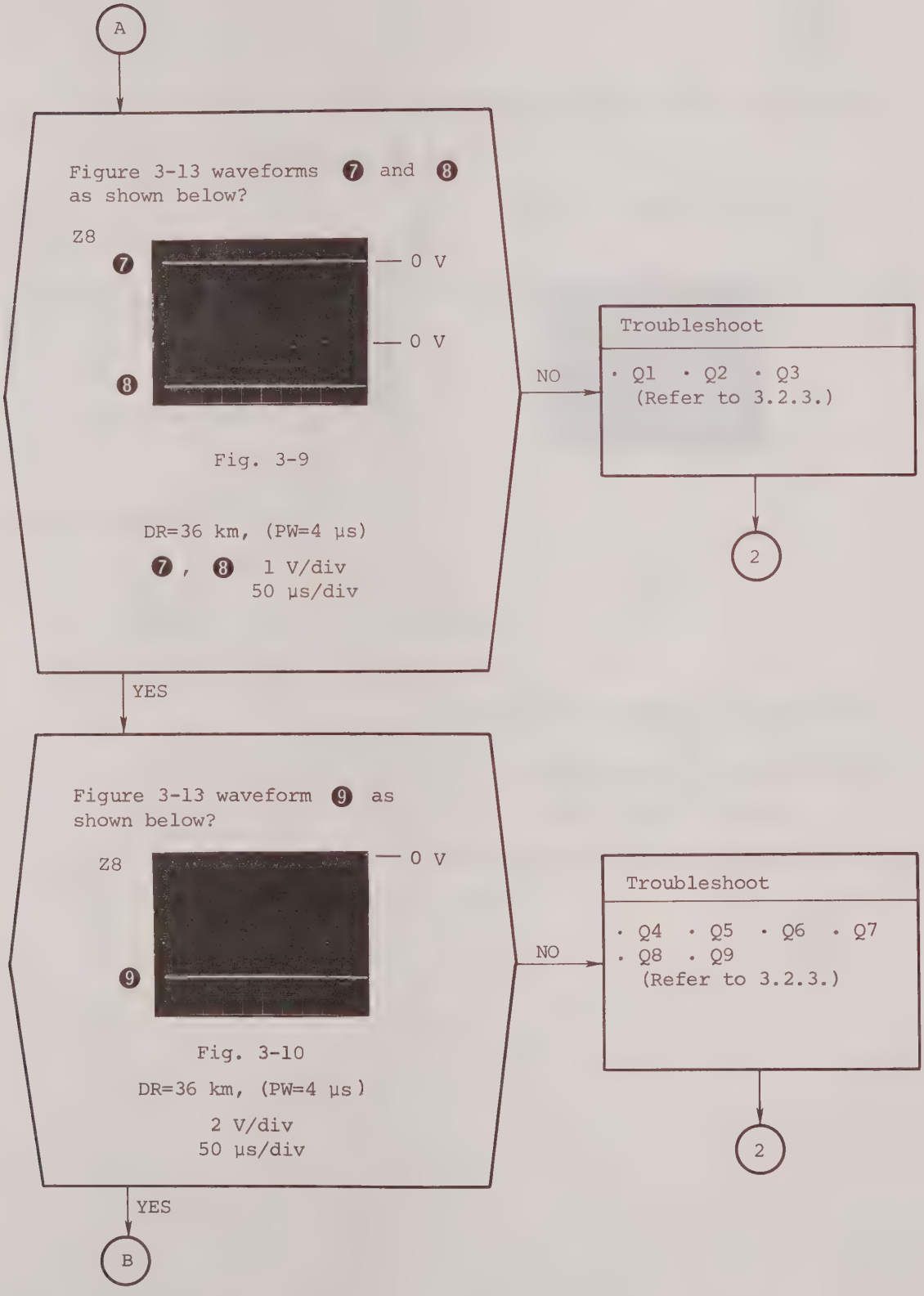
NO →

Troubleshoot and Repair

· Z16 Unit Motherboard (Refer to 3.6.7.)

YES

A


A
Figure 3-13 waveforms ❼ and ❽ as shown below?
Z8
❼
❽
0 V
0 V
Fig. 3-9
DR=36 km, (PW=4 µs)
❼, ❽ 1 V/div
50 µs/div
NO
Troubleshoot
· Q1 · Q2 · Q3
(Refer to 3.2.3.)
2
YES
Figure 3-13 waveform ❾ as shown below?
Z8
❾
0 V
Fig. 3-10
DR=36 km, (PW=4 µs)
2 V/div
50 µs/div
NO
Troubleshoot
· Q4 · Q5 · Q6 · Q7
· Q8 · Q9
(Refer to 3.2.3.)
2
YES
B

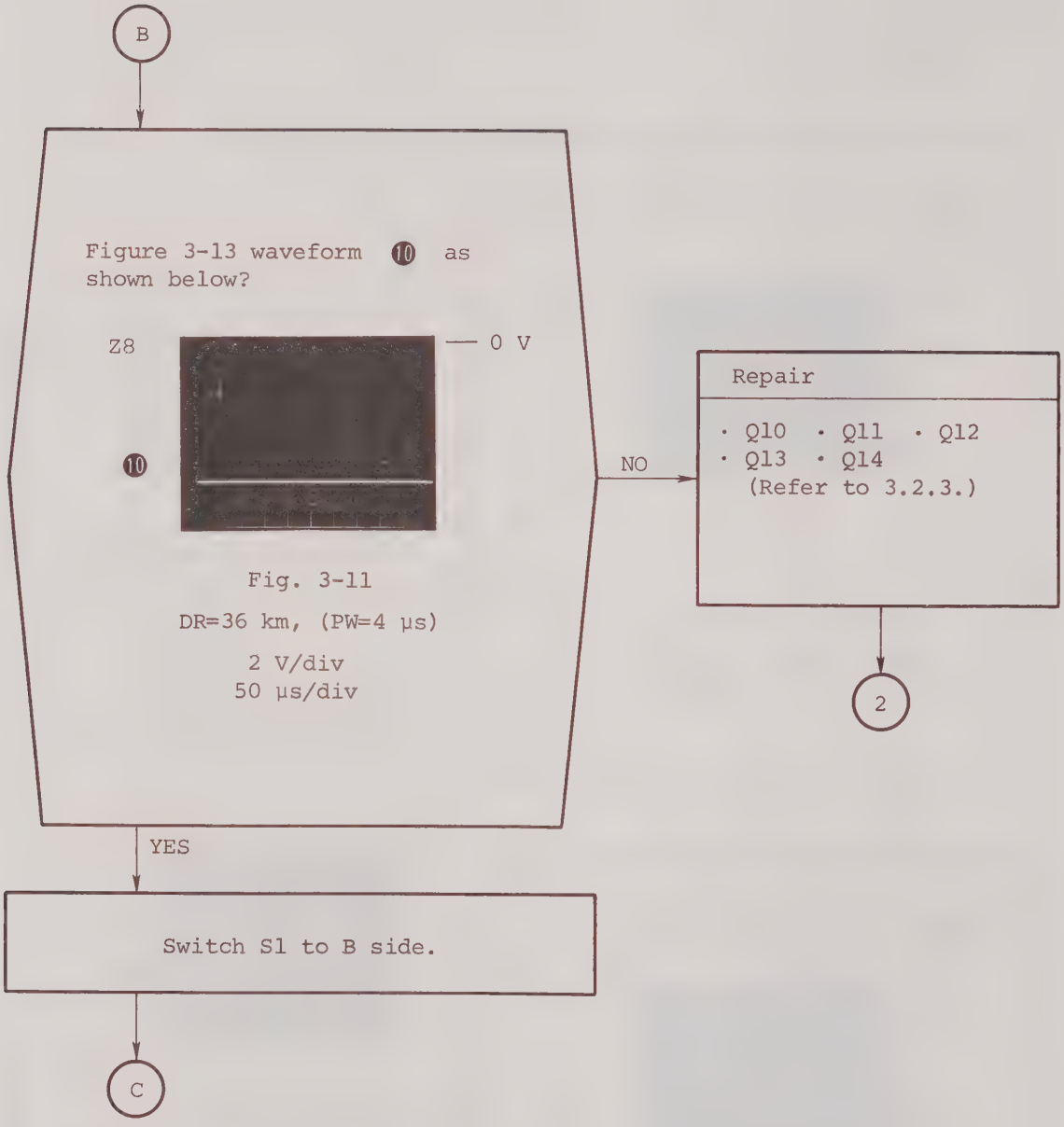
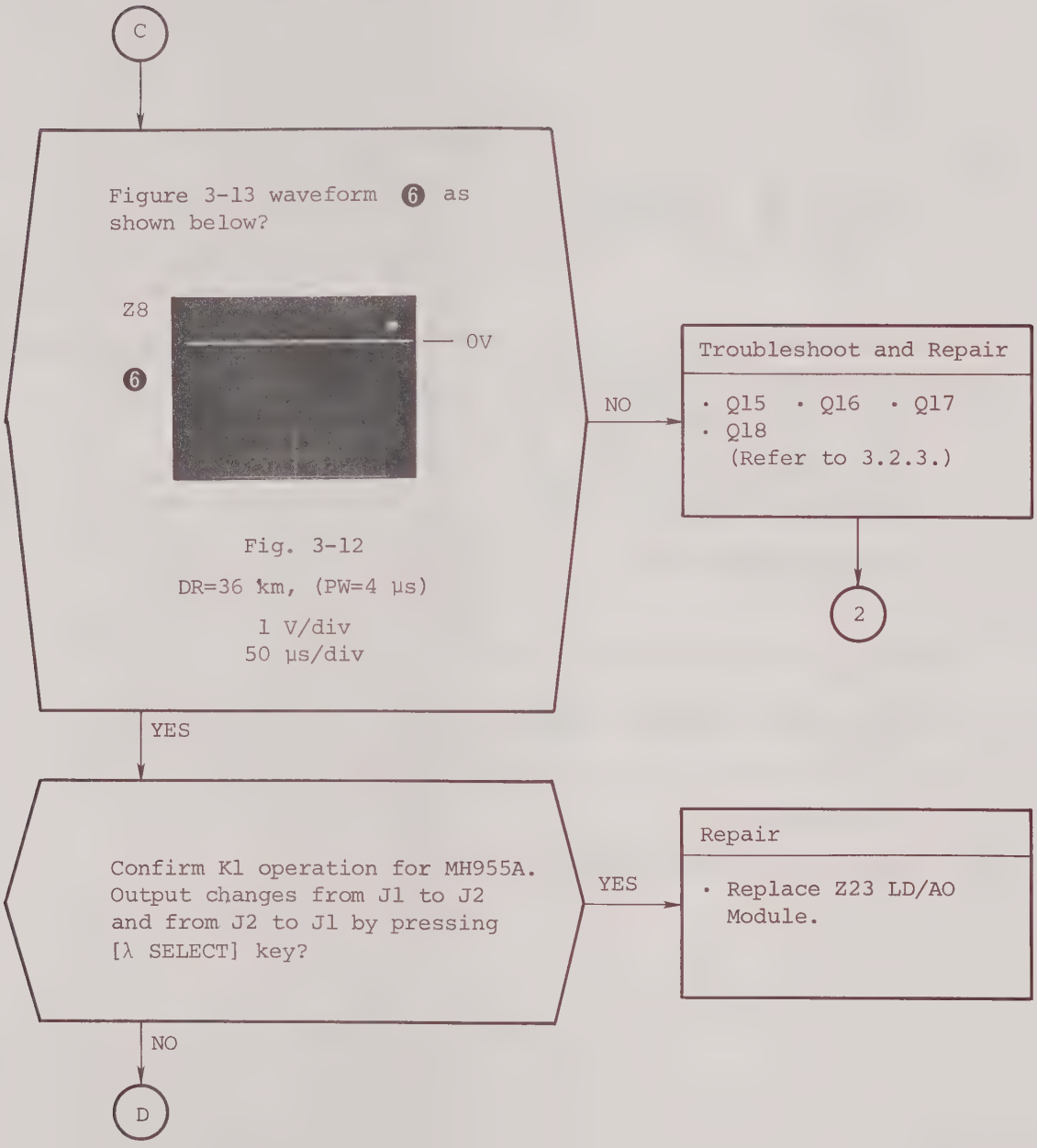


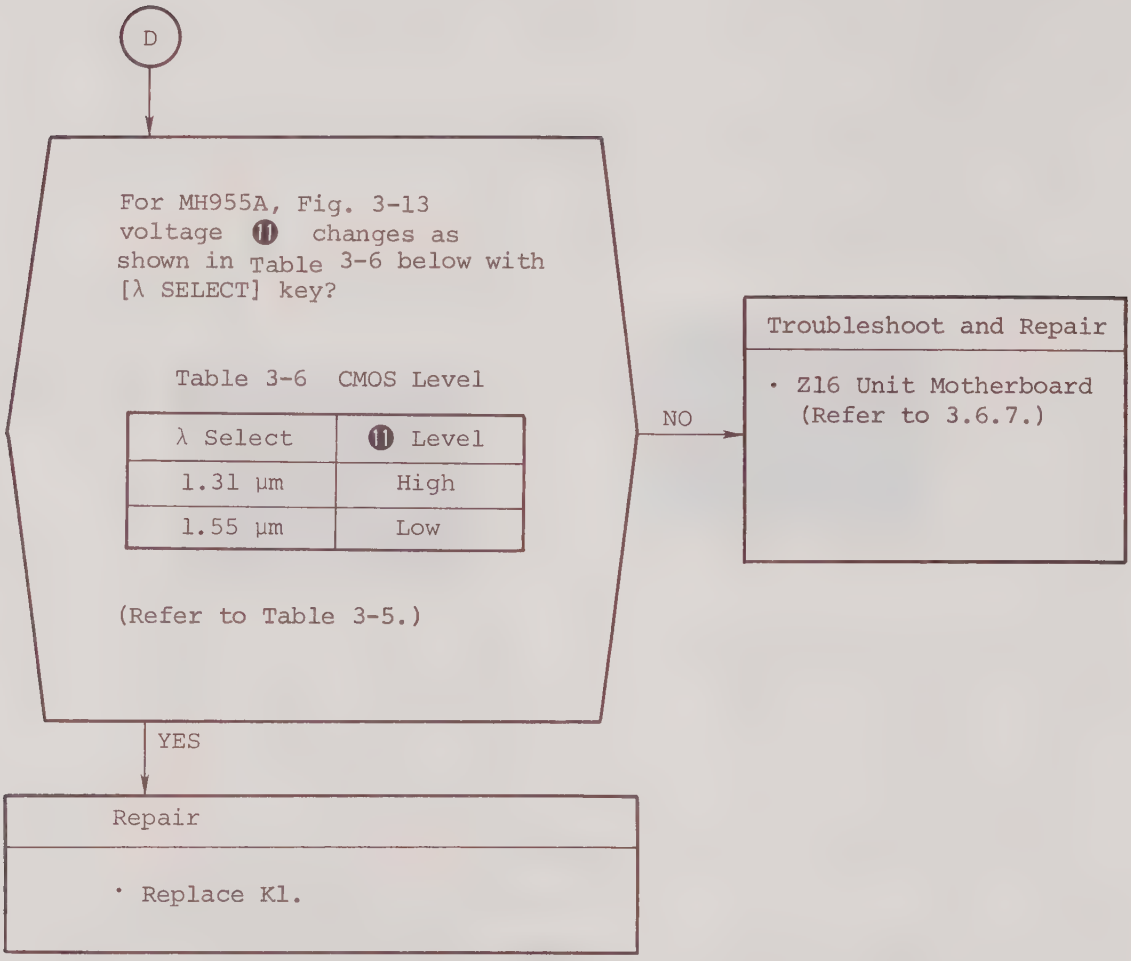
Fig. 3-11

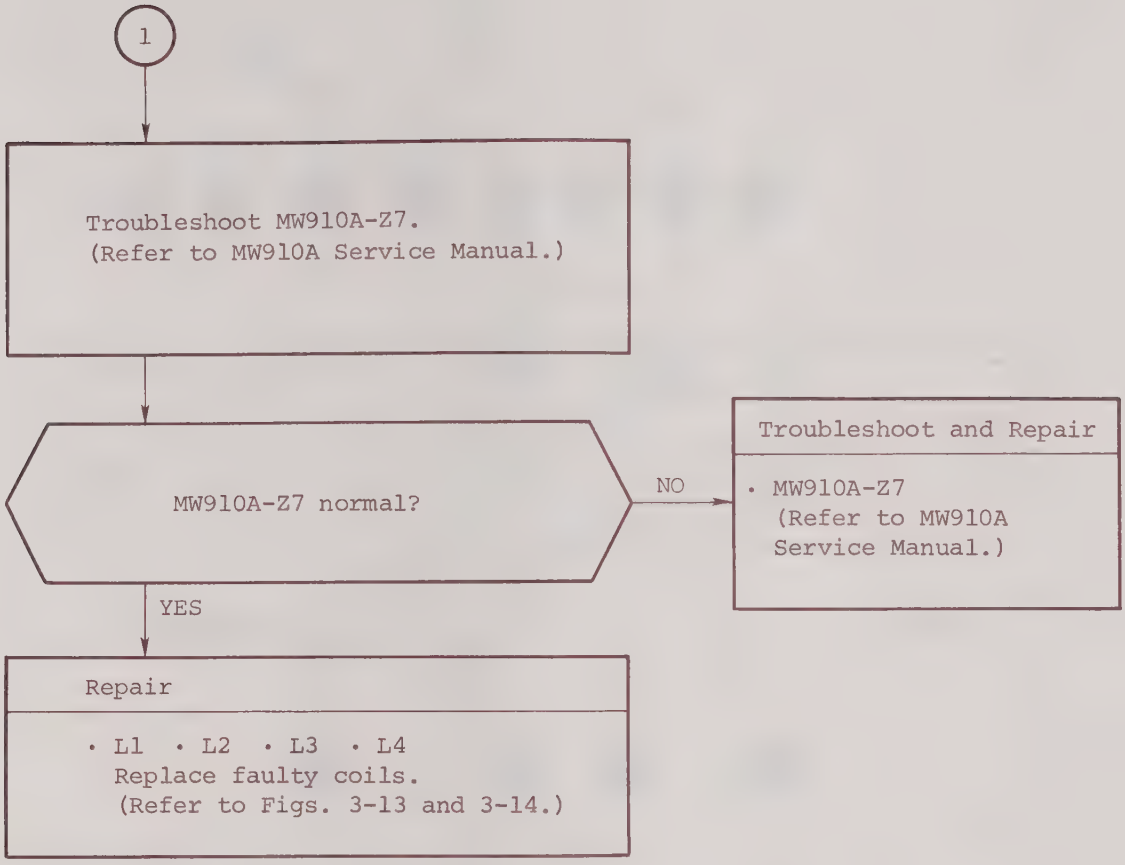
DR=36 km, (PW=4 µs)

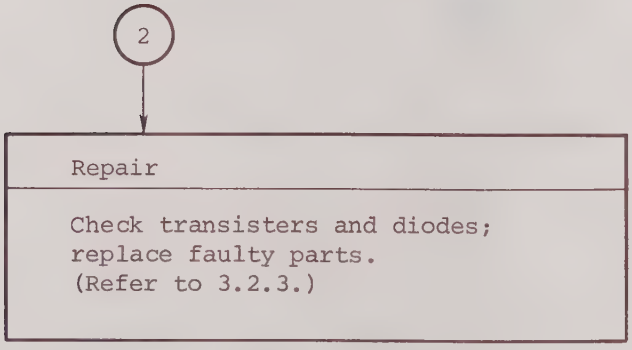
2 V/div

50 µs/div


C
Figure 3-13 waveform ❻ as shown below?
Z8
❻
0V
NO
Troubleshoot and Repair
· Q15 · Q16 · Q17
· Q18
(Refer to 3.2.3.)
2
Fig. 3-12
DR=36 km, (PW=4 µs)
1 V/div
50 µs/div
YES
Confirm K1 operation for MH955A. Output changes from J1 to J2 and from J2 to J1 by pressing [λ SELECT] key?
YES
Repair
· Replace Z23 LD/AO Module.
NO
D


D
For MH955A, Fig. 3-13 voltage ⓫ changes as shown in Table 3-6 below with [λ SELECT] key?
Table 3-6 CMOS Level
λ Select
⓫ Level
1.31 µm
High
1.55 µm
Low
(Refer to Table 3-5.)
NO
Troubleshoot and Repair
· Z16 Unit Motherboard (Refer to 3.6.7.)
YES
Repair
· Replace K1.


1
Troubleshoot MW910A-Z7.
(Refer to MW910A Service Manual.)
MW910A-Z7 normal?
NO
Troubleshoot and Repair
· MW910A-Z7
(Refer to MW910A
Service Manual.)
YES
Repair
· L1 · L2 · L3 · L4
Replace faulty coils.
(Refer to Figs. 3-13 and 3-14.)


2
Repair
Check transisters and diodes;
replace faulty parts.
(Refer to 3.2.3.)

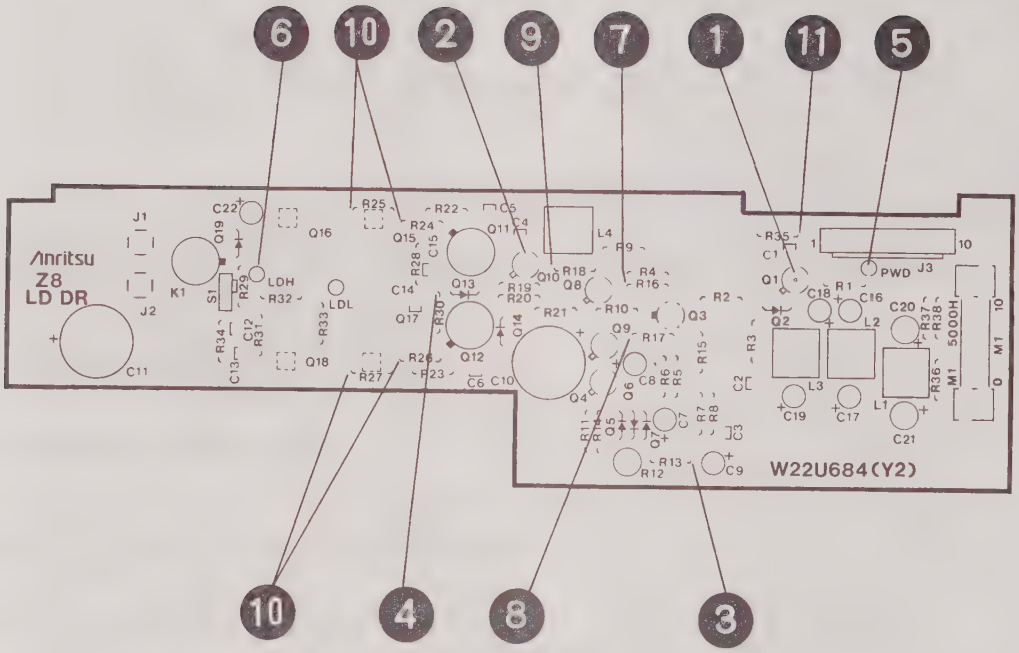
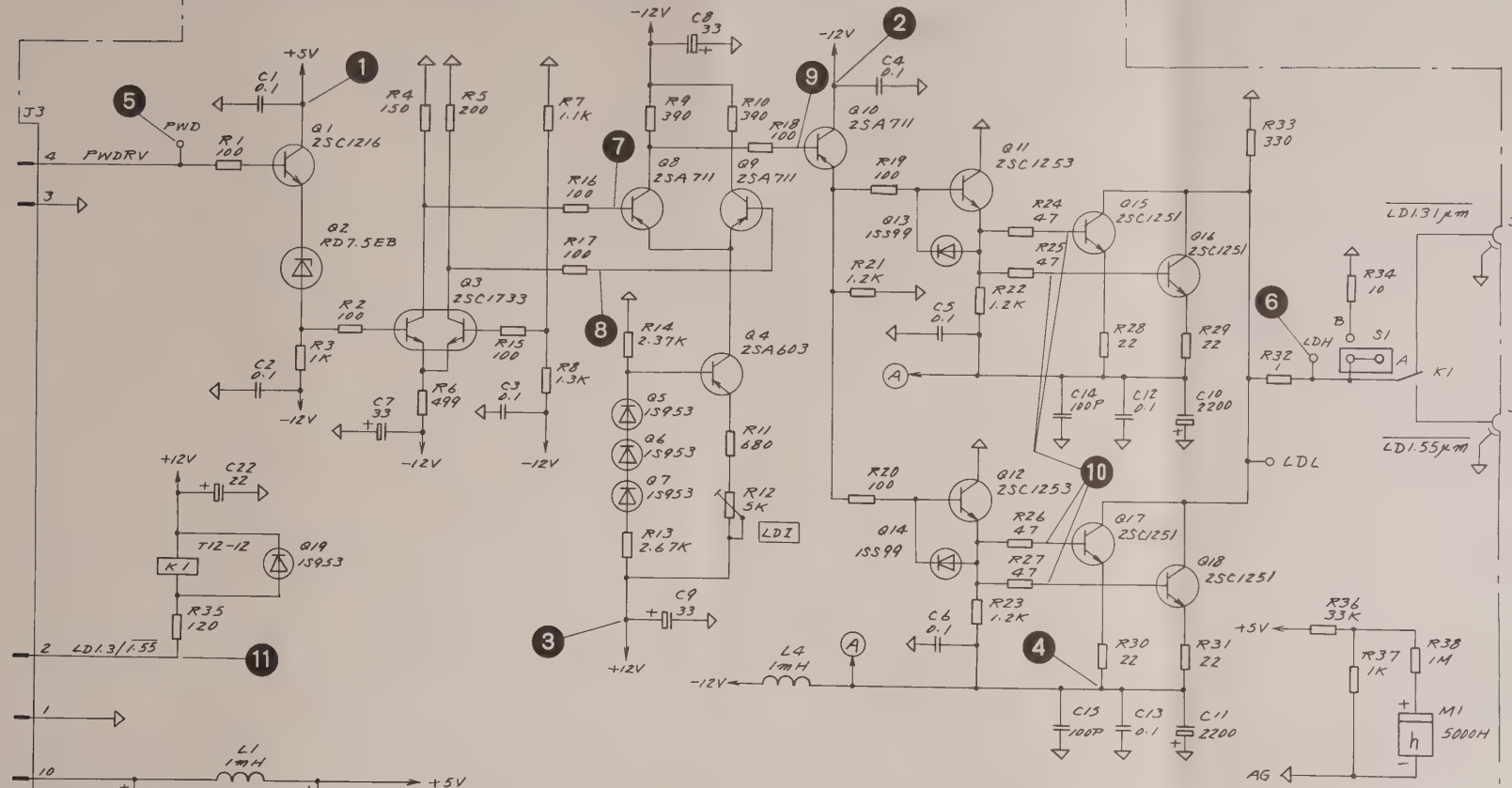


Fig. 3-13 Z8 DR PC Board Component Layout



Note : K1 relay pins 6 and 8 is a short circuit, except in the MH955A.

Parts Lists	W4W9548 (MH937A, MH938A, MH939A)
	W4W9578 (MH955A)

W22U684

Fig. 3-14 Z8 LD DR PC Board Circuit Diagram
W3W3768 1/1

3.6.4 Z9 AO DR PC Board

(1) Circuit description

This PC board is a drives circuit for the AO switch. The Burst signal is produced by the drive timing signal sent from the Z16 Unit Motherboard and is sent to the AO switch in the Z23 LD/AO module.

(2) Troubleshooting and repair

Setup: Connect the Z9-J2 output and oscilloscope through the BNC - OSM cord, 50 Ω, 20 dB attenuator, and 50 Ω terminator as shown in Fig. 3-15.

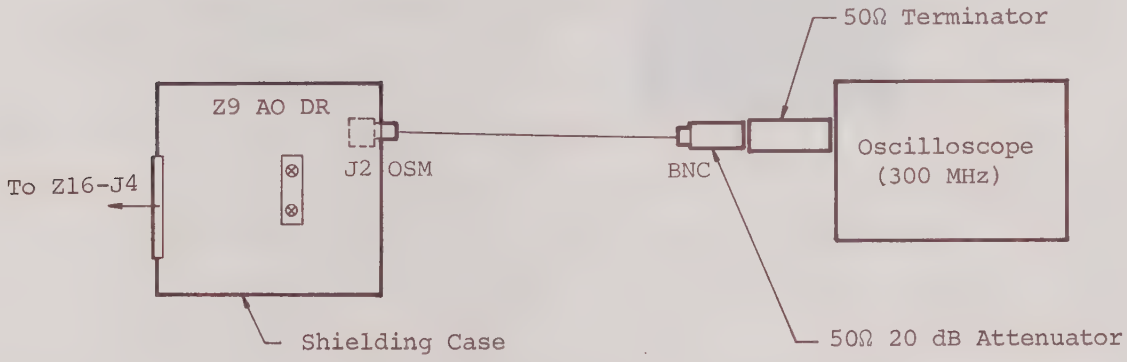


Fig. 3-15 Troubleshooting Setup

Z16 Unit Motherboard waveform ⑰ normal?

NO → **Troubleshoot and repair**

Z16 Unit Motherboard (Refer to 3.6.7.)

YES

When observing the J2 output by the oscilloscope as shown in Fig. 3-15, the waveform the same as shown in Fig. 3-16?

Amplitude is the same as indicated on Z23 LD/AO module?

Z9 ⑧ with 50 Ω termination

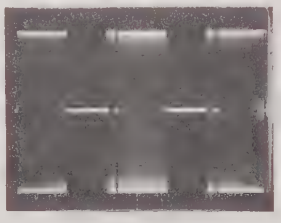


Fig. 3-16

DR=18 km

2 V/div
50 µs/div

NO → **Repair**

Order Z9 AO DR repairment from agent or factory service department.

YES

Repair

Z23 LD/AO module faulty; replace.

3.6.5 Z11 AMP PC Board

(1) Circuit description

This PC board amplifies the signal converted to the electric signal by the APD. Q1 converts the output signal from the APD from current to voltage. Q13, Q14, Q15, and Q16 make up a preamplifier and amplify the voltage of the signal from Q1. Q17, Q18, Q19, Q23, Q24, and Q25 make up the circuit that automatically adjusts the offset of this preamplifier. The signal amplified by this preamplifier passes through a resistance attenuator. (Attenuation is set at the panel.)

The attenuated signal passes through the main differential amplifier and is output to the A/D converter in the MW910A. At this main amplifier, the noise generated by Q71 is mixed with the signal to raise the averaging precision.

The zero level is also adjusted by Q64 and Q65 and the main amplifier for A/D signal conversion.

The APD bias current supply circuit is also built-in the Z11.

(2) Troubleshooting and repair

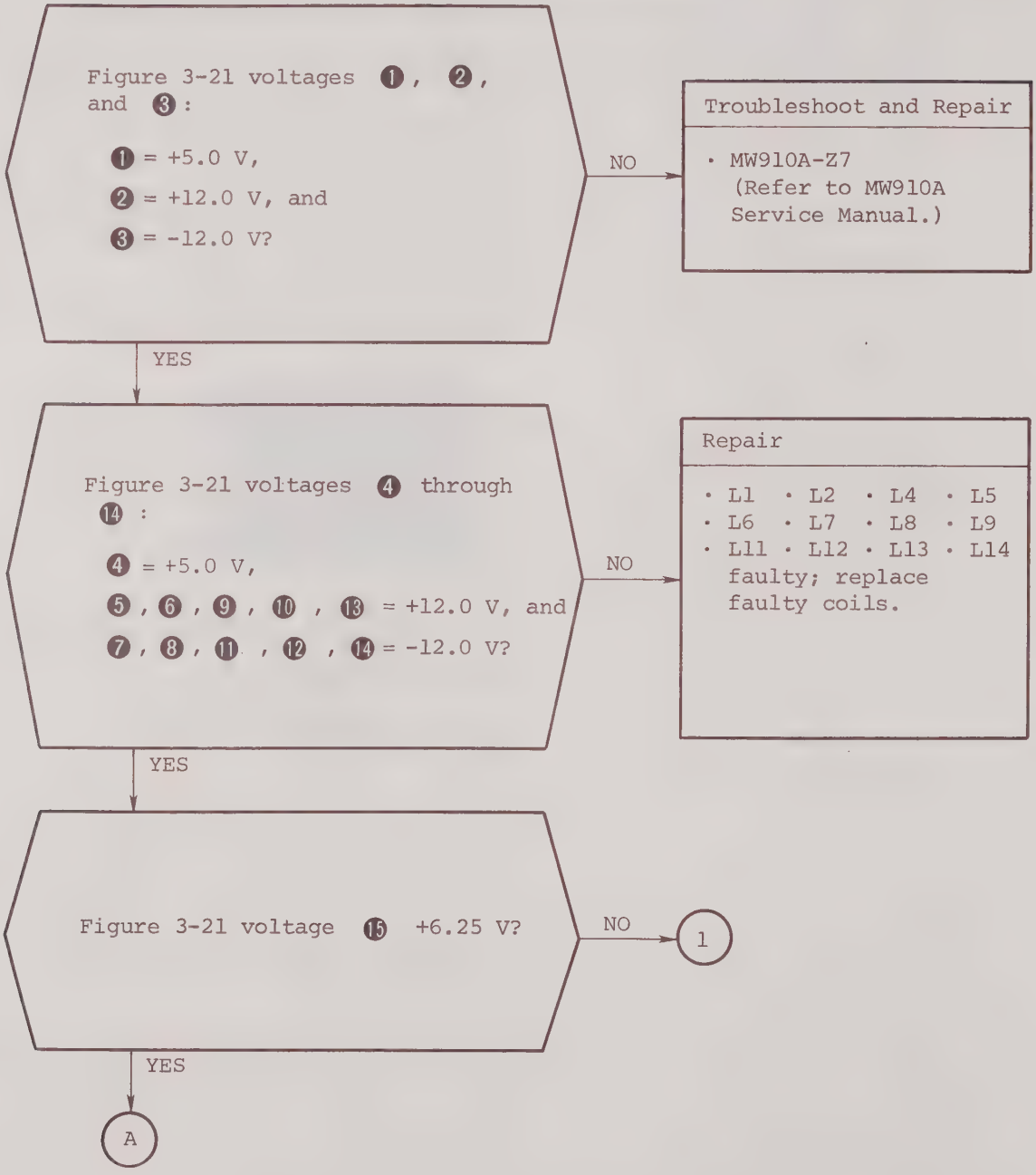
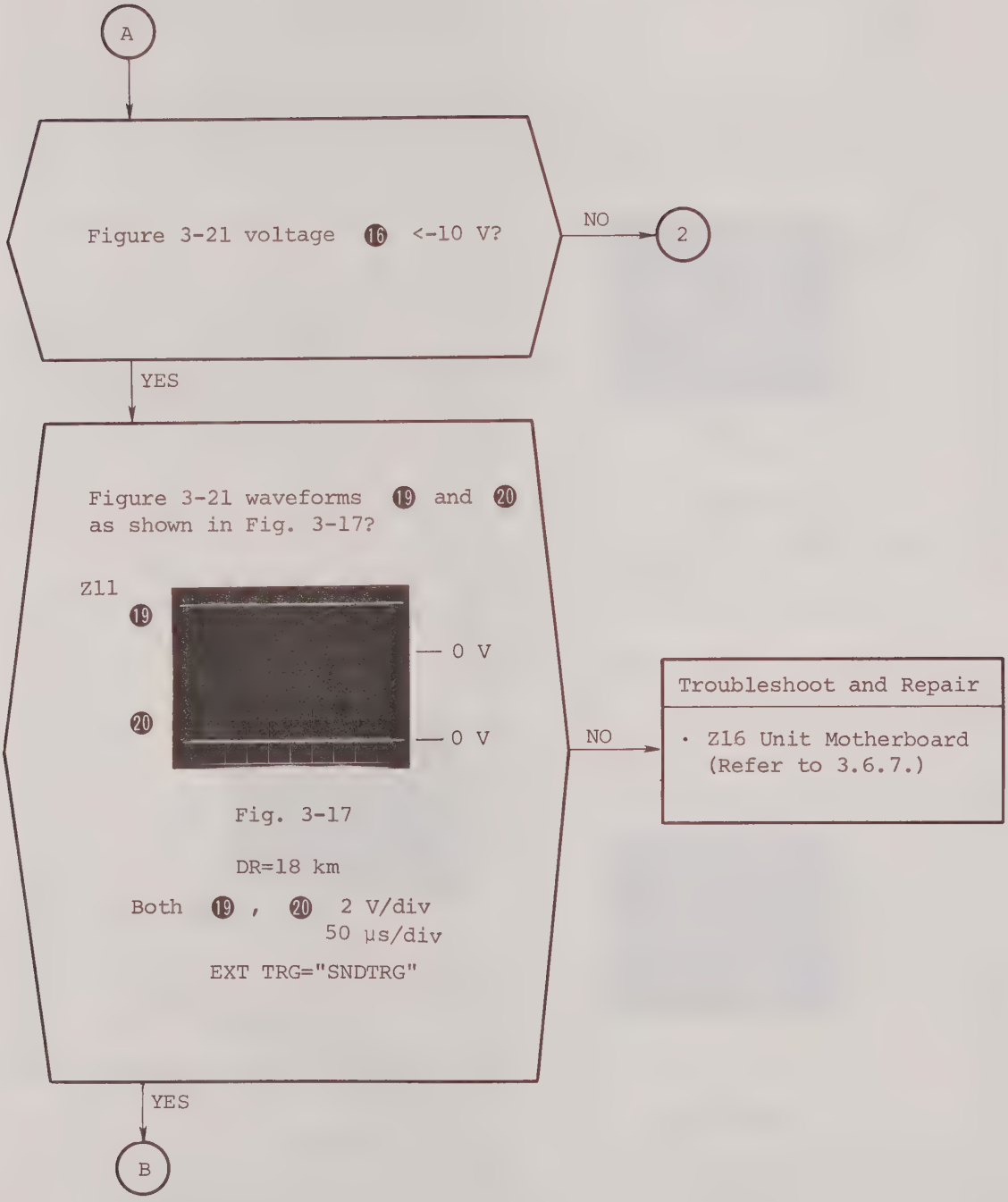


Figure 3-21 voltages ❶, ❷, and ❸:
❶ = +5.0 V,
❷ = +12.0 V, and
❸ = -12.0 V?
NO
Troubleshoot and Repair
• MW910A-Z7 (Refer to MW910A Service Manual.)
YES
Figure 3-21 voltages ❹ through ⓮:
❹ = +5.0 V,
❺, ❻, ❾, ❿, ⓭ = +12.0 V, and
❼, ❽, ⓫, ⓬, ⓮ = -12.0 V?
NO
Repair
• L1 • L2 • L4 • L5
• L6 • L7 • L8 • L9
• L11 • L12 • L13 • L14
faulty; replace faulty coils.
YES
Figure 3-21 voltage ⓯ +6.25 V?
NO
1
YES
A


A
Figure 3-21 voltage ⑯ <-10 V?
NO
2
YES
Figure 3-21 waveforms ⑲ and ⑳ as shown in Fig. 3-17?
Z11
⑲
⑳
0 V
0 V
NO
Troubleshoot and Repair
· Z16 Unit Motherboard (Refer to 3.6.7.)
Fig. 3-17
DR=18 km
Both ⑲ , ⑳ 2 V/div
50 µs/div
EXT TRG="SNDTRG"
YES
B

B

Figure 3-21 waveforms ㉑ and ㉒ as shown in Fig. 3-18 below?

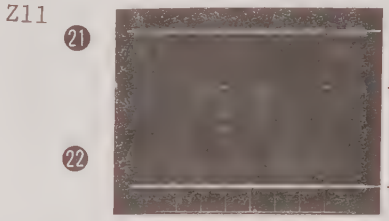


Fig. 3-18

DR=18 km

Both ㉑ , ㉒ 2 V/div
50 µs/div

EXT TRG="SNDTRG"

NO

Troubleshoot and Repair

- Z16 Unit Motherboard (Refer to 3.6.7.)

Figure 3-21 waveform ㉓ (PA0) as shown in Fig. 3-19?

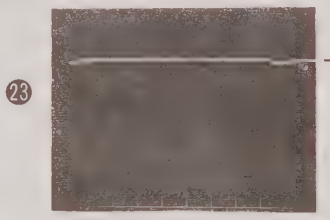


Fig. 3-19

DR=36 km

20 mV/div
50 µs/div

TRG="SNDTRG"

NO

Repair

- Z11 AMP faulty; replace.

YES

C

C

Set CRT display to "GAIN=0.0 dB" with MW910A [GAIN ADJ] key and rotary control.

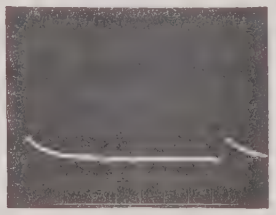
Figure 3-21 waveforms ㉓ and ㉔ the same?
(Refer to Fig. 3-19)

NO → 3

YES

Figure 3-21 waveforms ㉘ as shown in Fig. 3-20?

㉘



0 V

Fig. 3-20

DR=36 km

GAIN ADJ=5.0 dB

1 V/div

50 µs/div

TRG="SNDTRG"

NO →

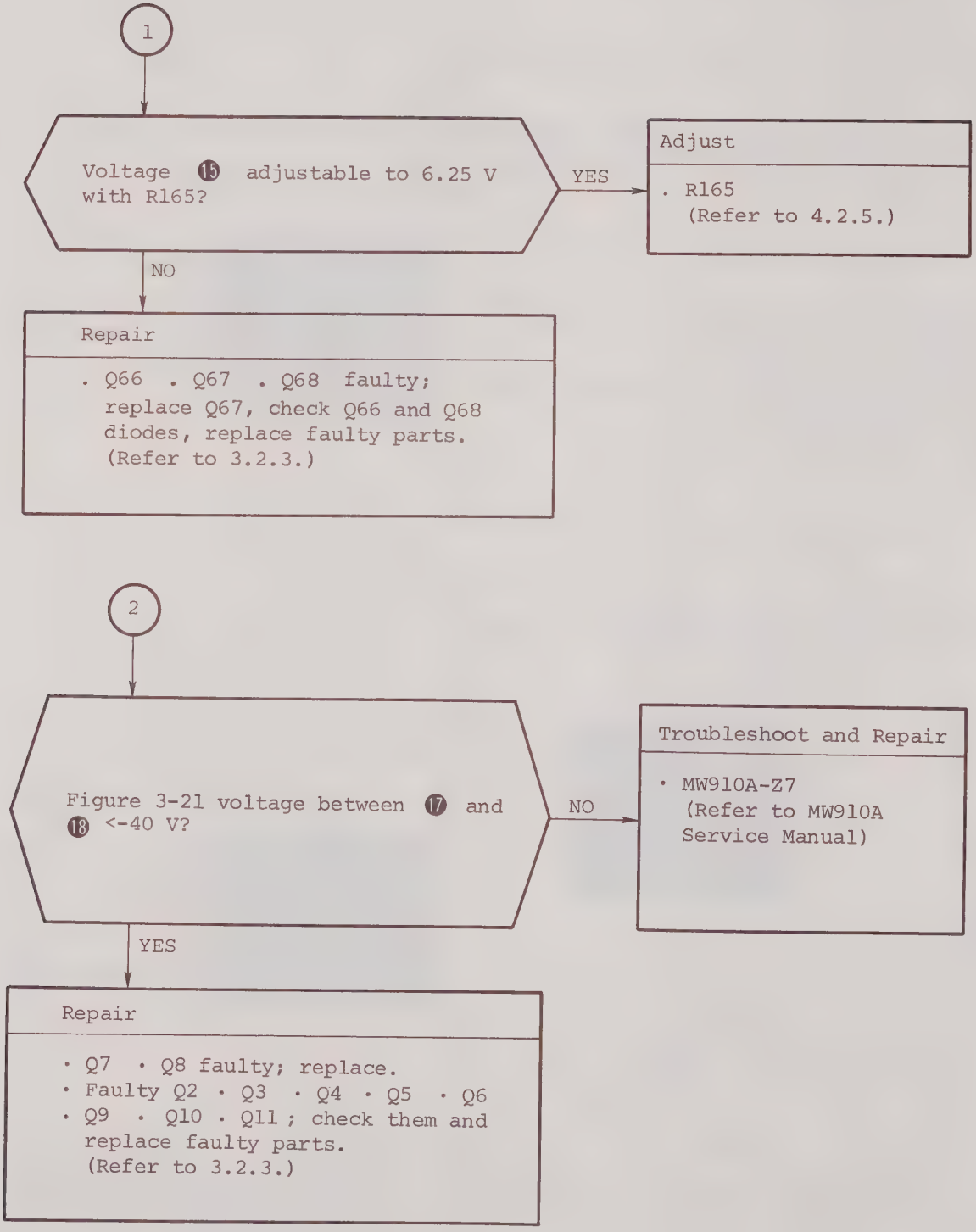
Repair

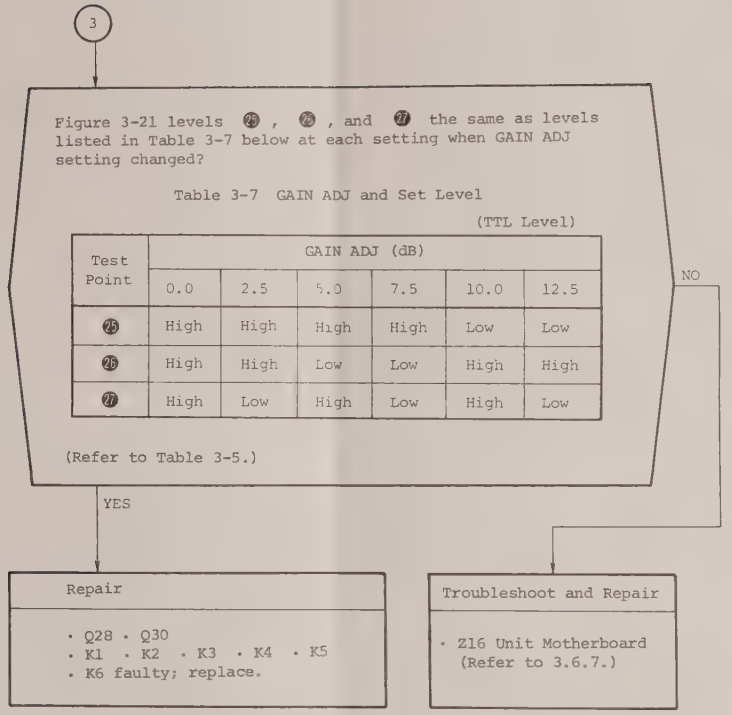
- Z11 AMP faulty; replace.

YES →

Troubleshoot and Repair

- MW910A-Z4 (Refer to MW910A Service Manual.)


1
Voltage ⑮ adjustable to 6.25 V with R165?
YES
Adjust
. R165
(Refer to 4.2.5.)
NO
Repair
. Q66 . Q67 . Q68 faulty; replace Q67, check Q66 and Q68 diodes, replace faulty parts.
(Refer to 3.2.3.)
2
Figure 3-21 voltage between ⑰ and ⑱ <-40 V?
NO
Troubleshoot and Repair
• MW910A-Z7
(Refer to MW910A Service Manual)
YES
Repair
• Q7 • Q8 faulty; replace.
• Faulty Q2 • Q3 • Q4 • Q5 • Q6
• Q9 • Q10 • Q11 ; check them and replace faulty parts.
(Refer to 3.2.3.)


3
Figure 3-21 levels ㉕ , ㉖ , and ㉗ the same as levels listed in Table 3-7 below at each setting when GAIN ADJ setting changed?
Table 3-7 GAIN ADJ and Set Level
(TTL Level)
Test Point
GAIN ADJ (dB)
0.0 2.5 5.0 7.5 10.0 12.5
㉕ High High High High Low Low
㉖ High High Low Low High High
㉗ High Low High Low High Low
(Refer to Table 3-5.)
NO
YES
Repair
· Q28 · Q30
· K1 · K2 · K3 · K4 · K5
· K6 faulty; replace.
Troubleshoot and Repair
· Z16 Unit Motherboard
(Refer to 3.6.7.)

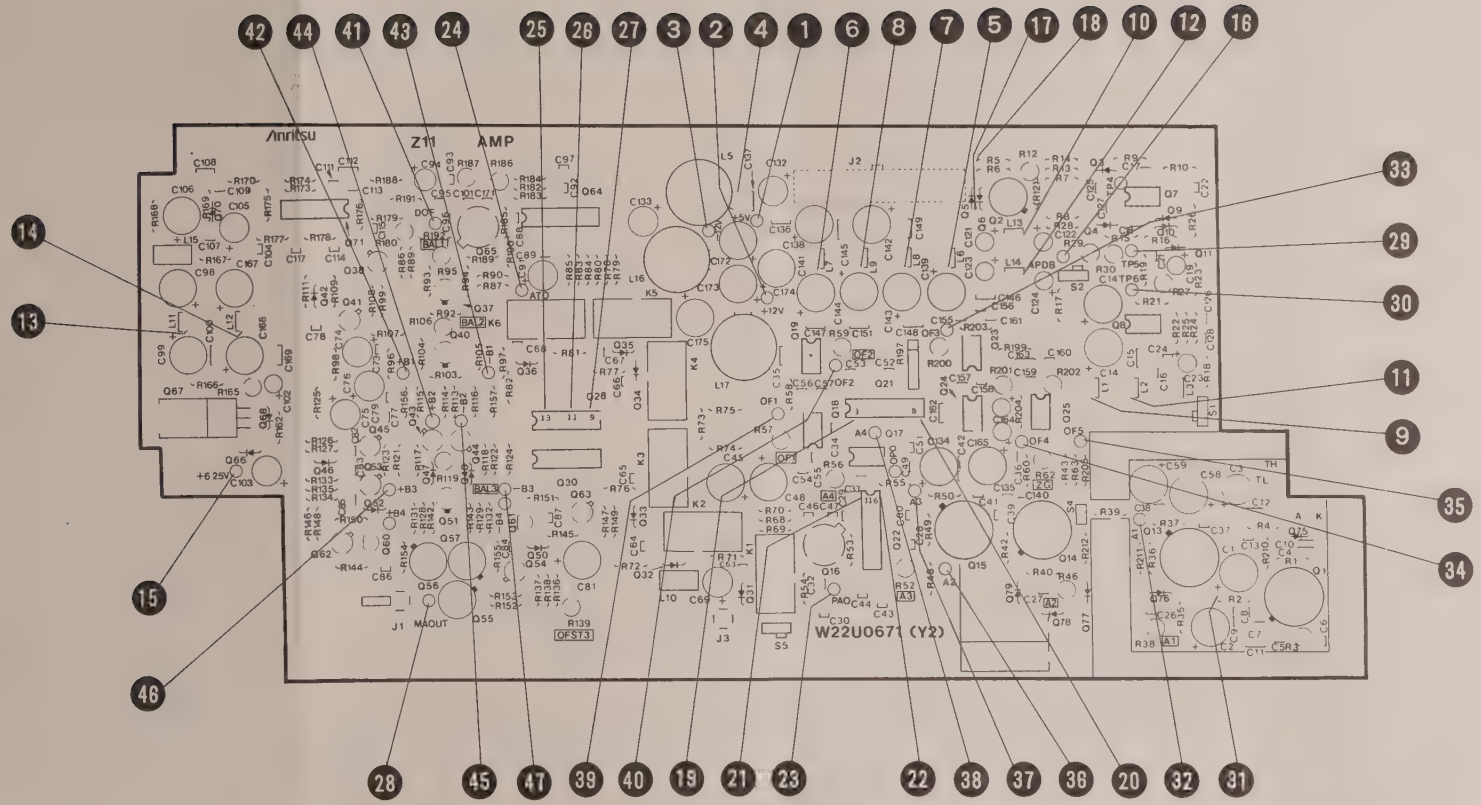
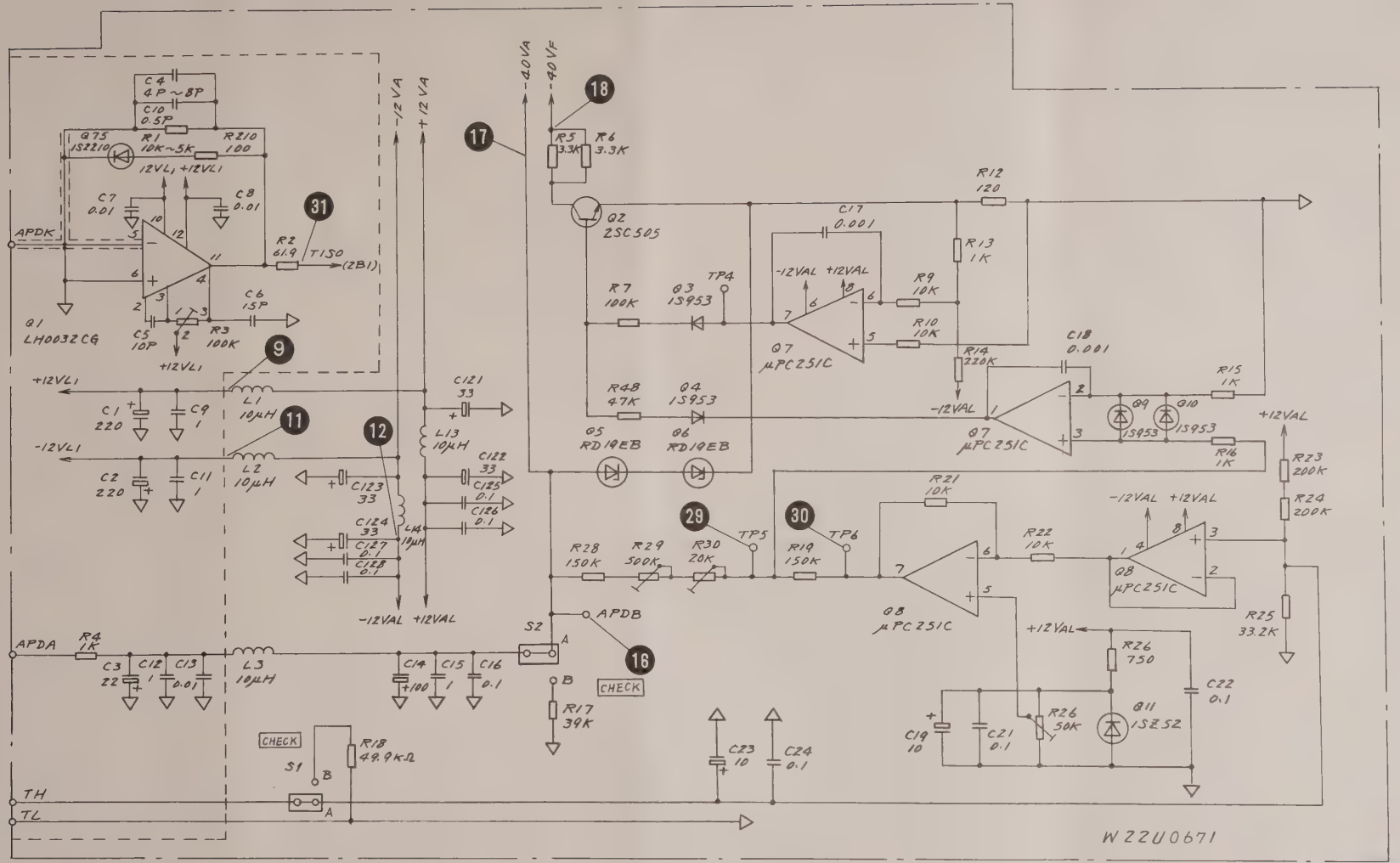


Fig. 3-21 Z11 AMP PC Board
Component Layout



Parts Lists	W4W9550 (MH937A)
	W4W9580 (MH938A) MH939A, MH955A)

Fig. 3-22(a) Z11 AMP PC Board Circuit Diagram

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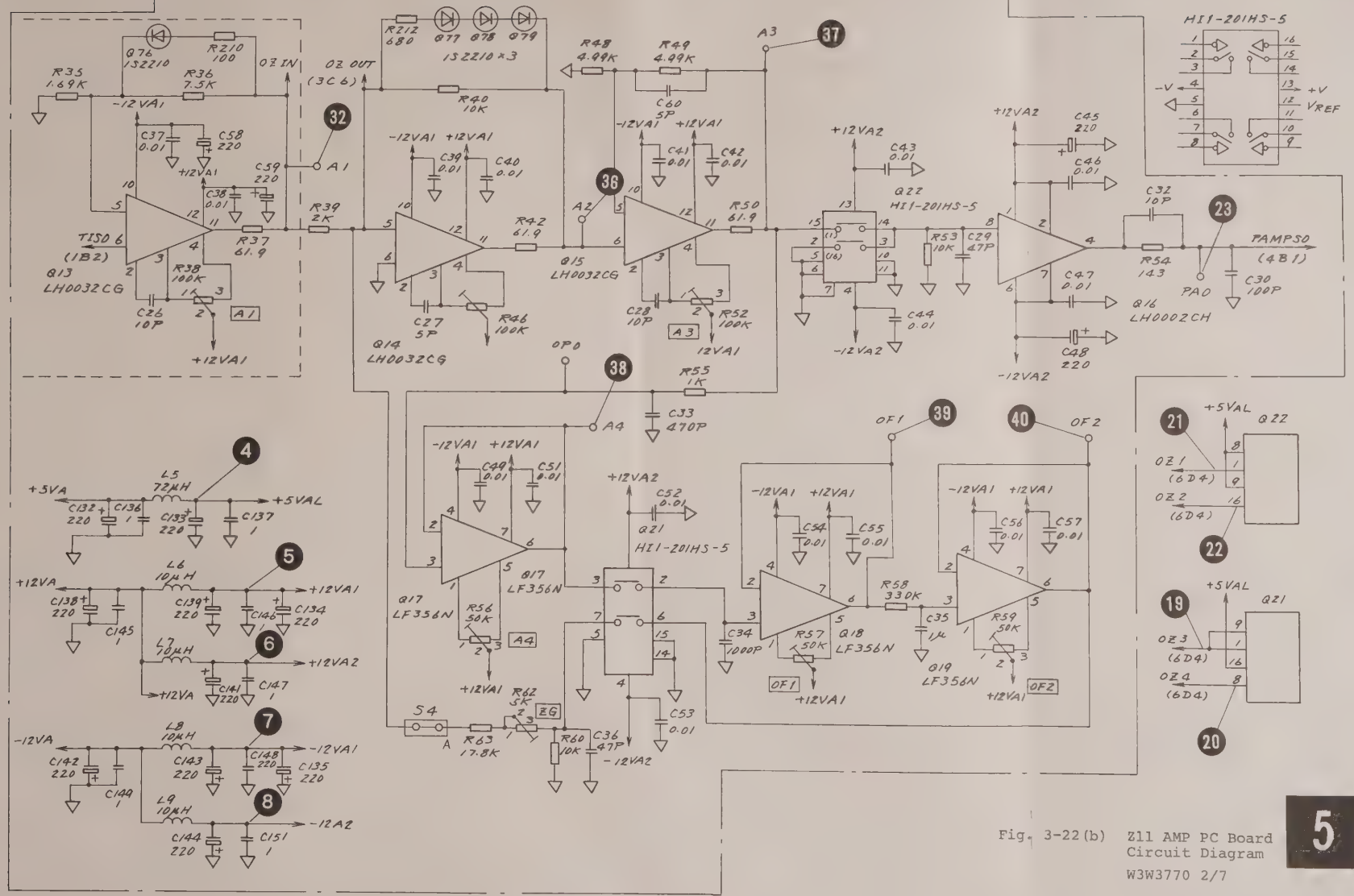

Fig. 3-22(b) Z11 AMP PC Board Circuit Diagram

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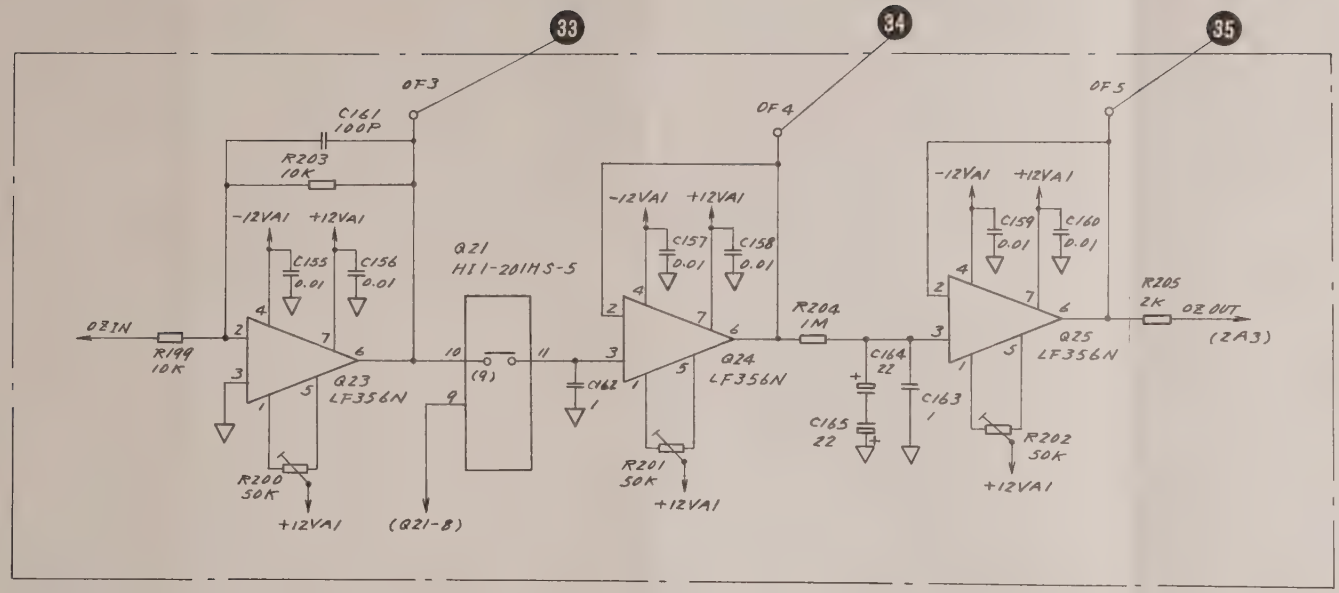

Fig. 3-22(c) Z11 AMP PC Board Circuit Diagram
W3W3770 3/7

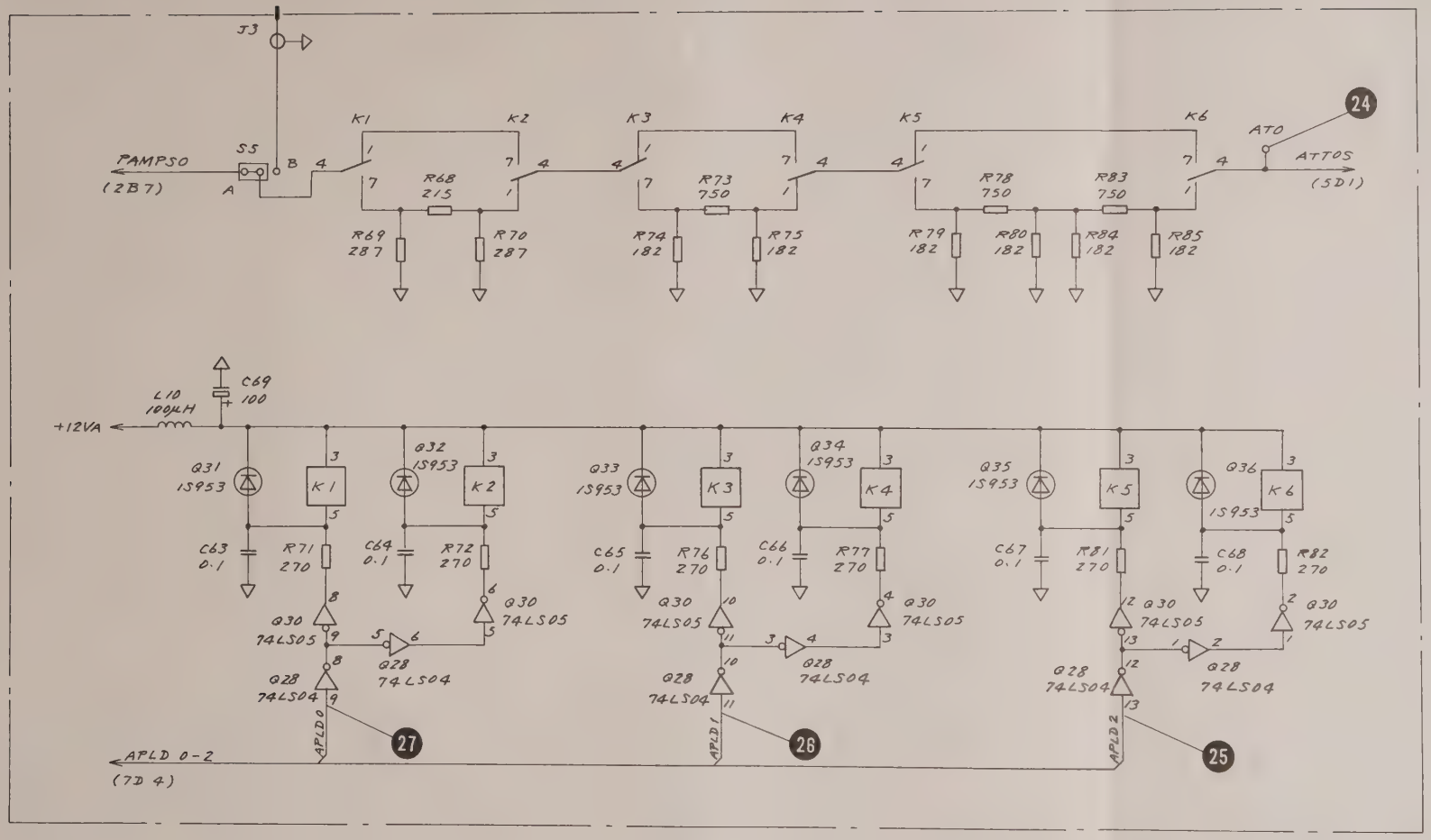

Fig. 3-22(d) Z11 AMP PC Board Circuit Diagram

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7

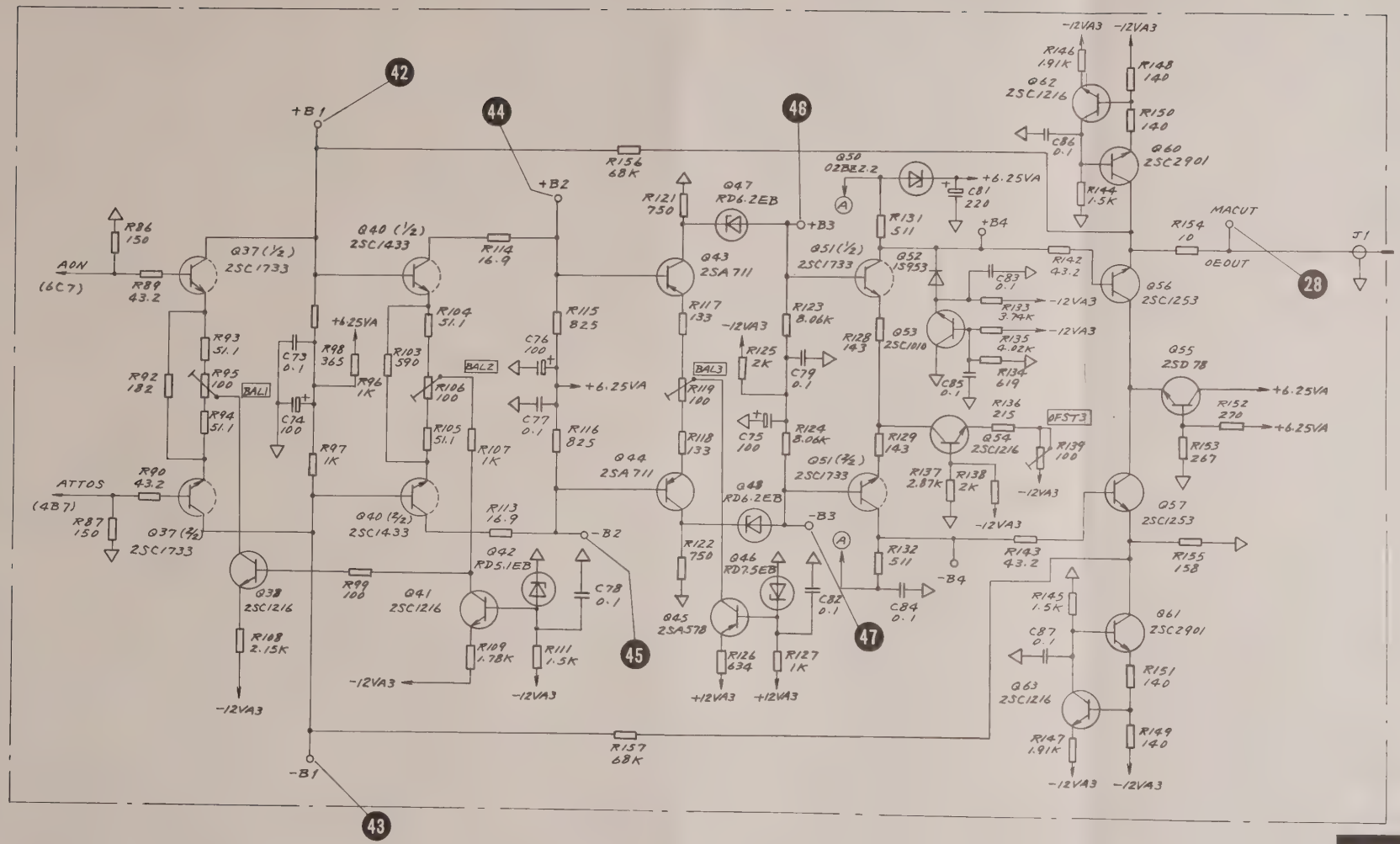

Fig. 3-22(e) Z11 AMP PC Board Circuit Diagram
W3W3770 5/7

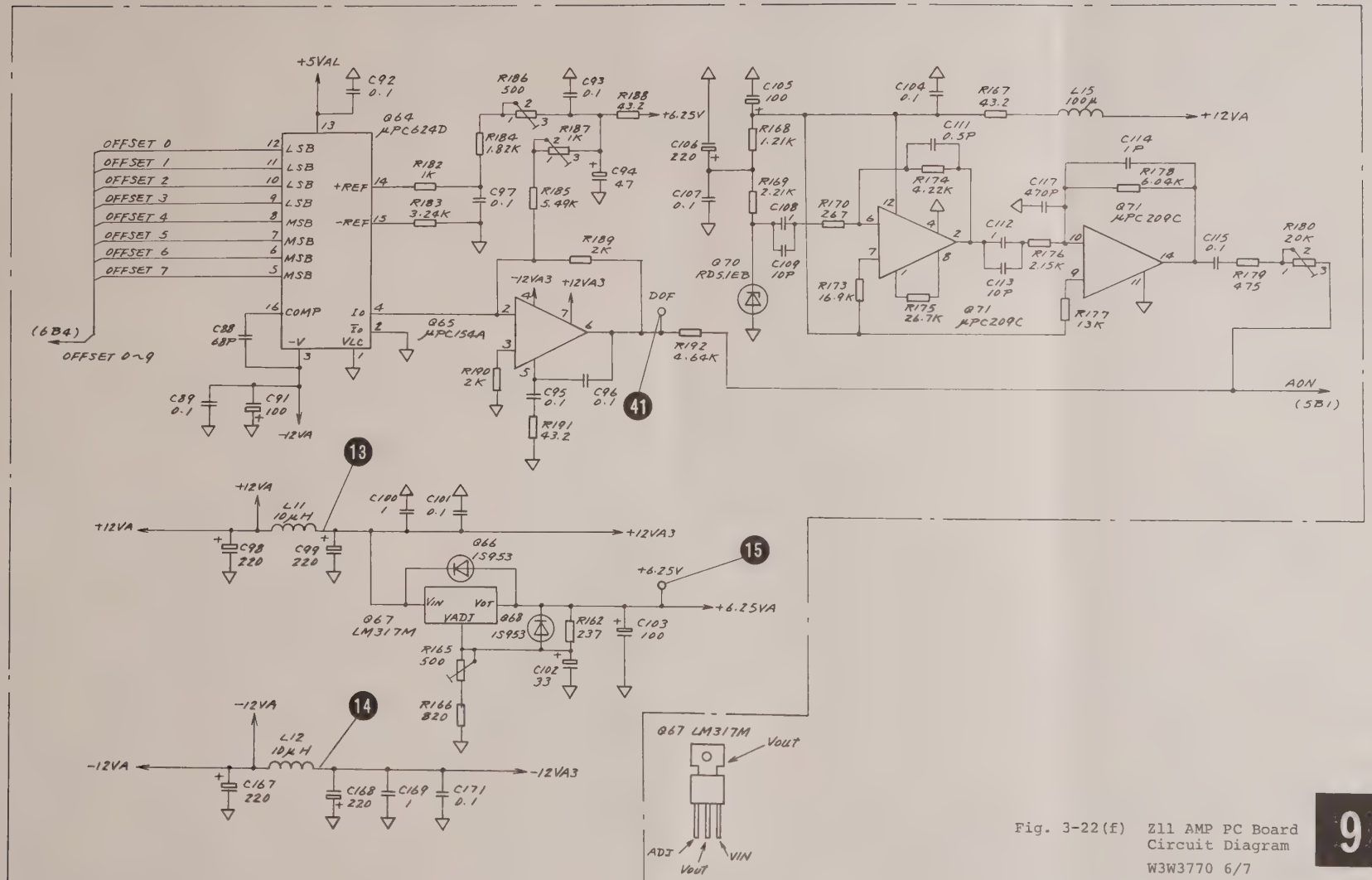

Fig. 3-22(f) Z11 AMP PC Board Circuit Diagram

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9

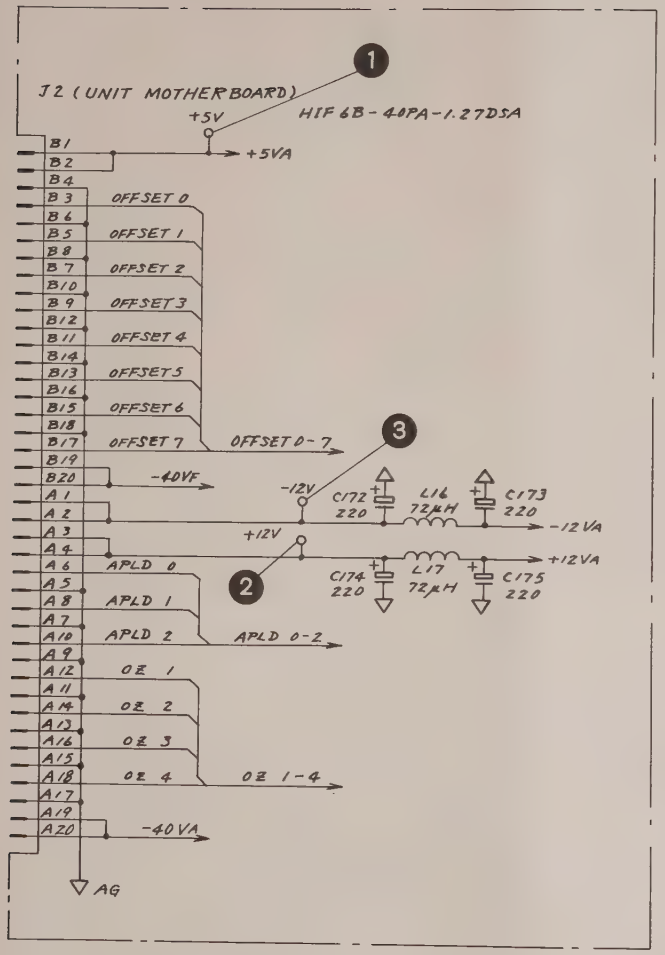


Fig. 3-22(g) Z11 AMP PC Board Circuit Diagram W3W3770 7/7

10

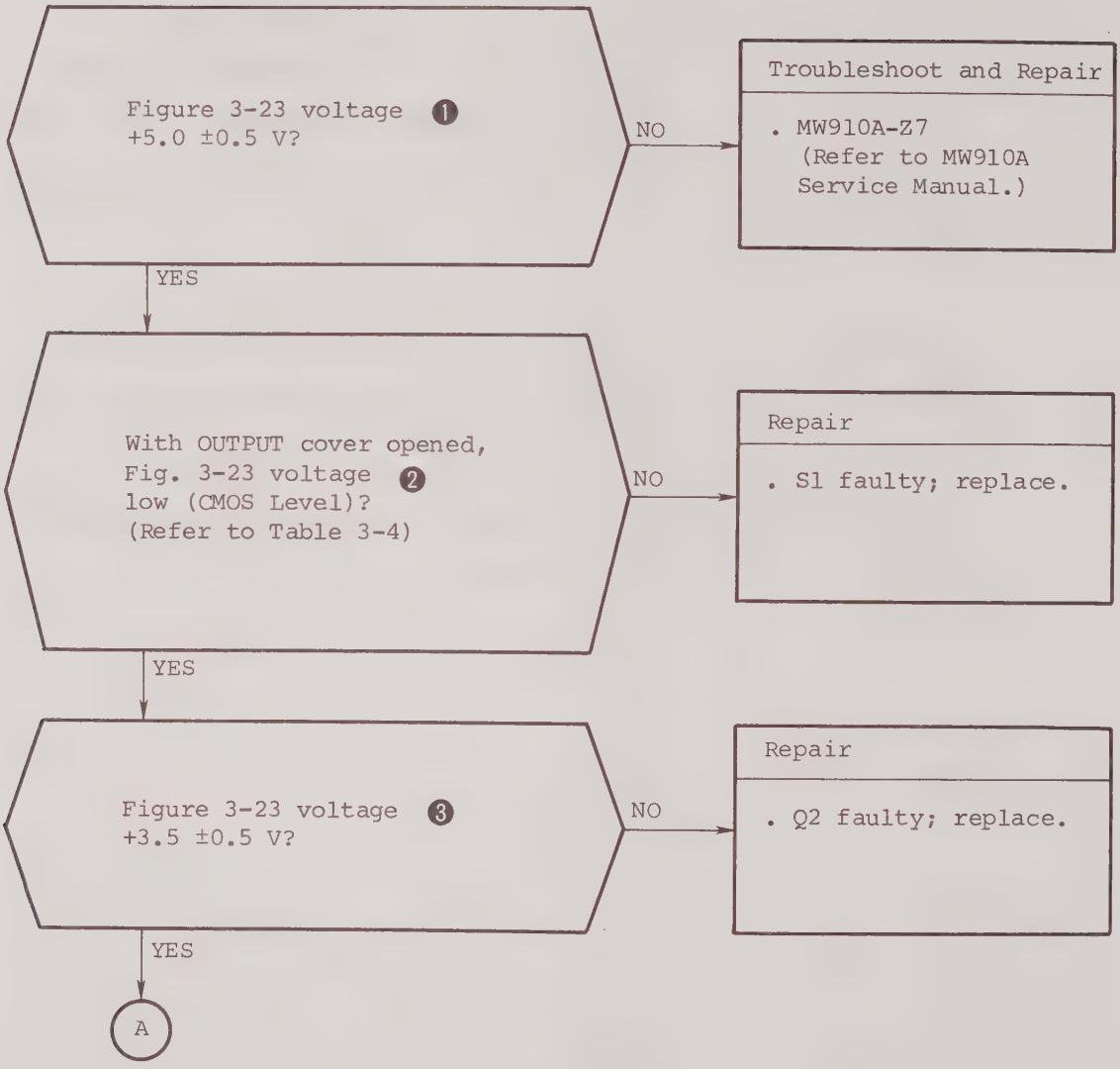
3.6.6 Z13 optical-connector sensor

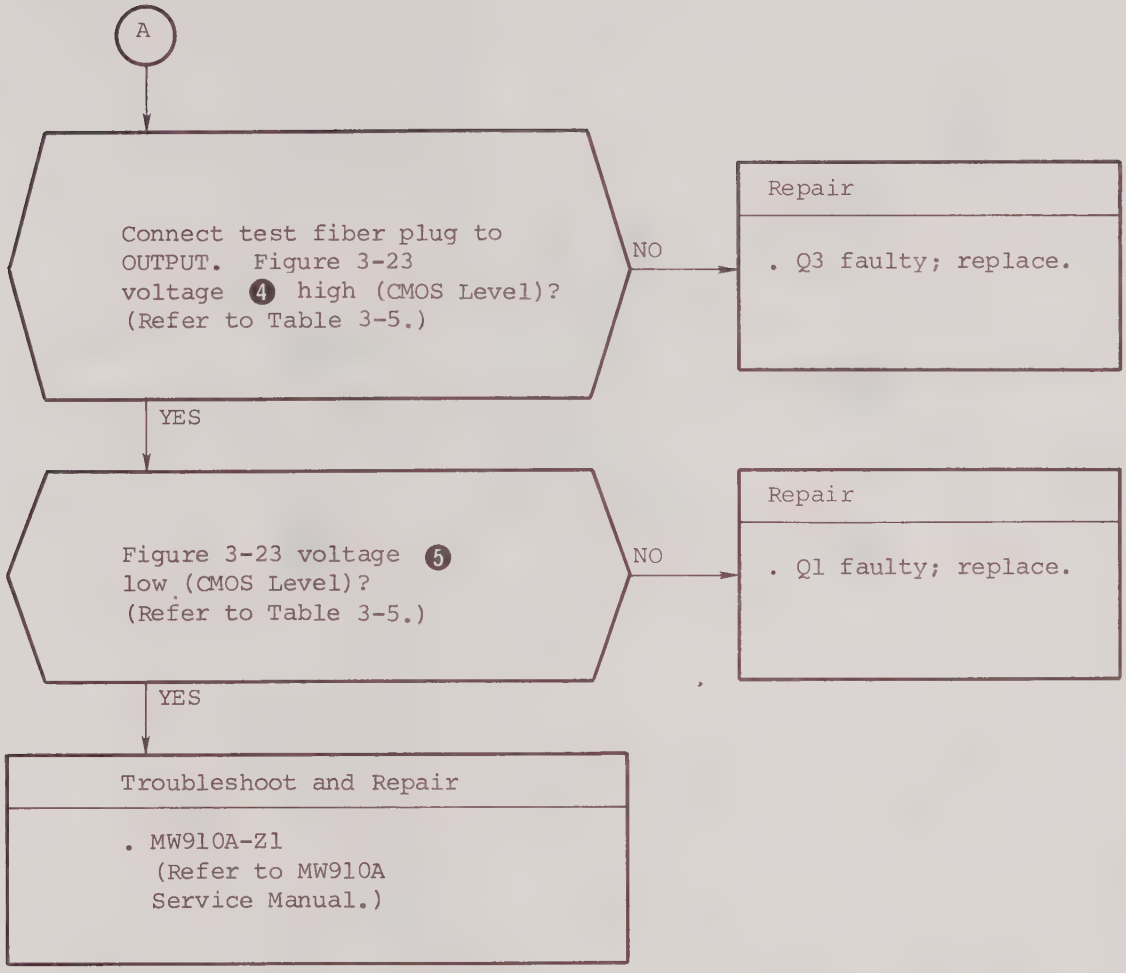
(1) Circuit description

This PC board is the laser beam safety circuit. It detects a test fiber connector and OUTPUT connector connection with the switch behind the output cover, the light-emitting diode, and phototransistor in the optical connector. The laser diode can oscillate only when the light is detected.

Q1 pin 6 level is high when the OUTPUT cover is opened and the test fiber is plugged in. The space between the light-emitting diode and phototransistor is blocked, so the phototransistor is turned off and Q1 pin 11 becomes high level. The level of $\overline{\text{CONON}}$ is made low by Q1 pins 6 and 11 NAND operation, and insertion of the test fiber is detected.

(2) Troubleshooting and repair




A
Connect test fiber plug to OUTPUT. Figure 3-23 voltage ❹ high (CMOS Level)? (Refer to Table 3-5.)
NO
Repair
. Q3 faulty; replace.
YES
Figure 3-23 voltage ❺ low (CMOS Level)? (Refer to Table 3-5.)
NO
Repair
. Q1 faulty; replace.
YES
Troubleshoot and Repair
. MW910A-Z1 (Refer to MW910A Service Manual.)

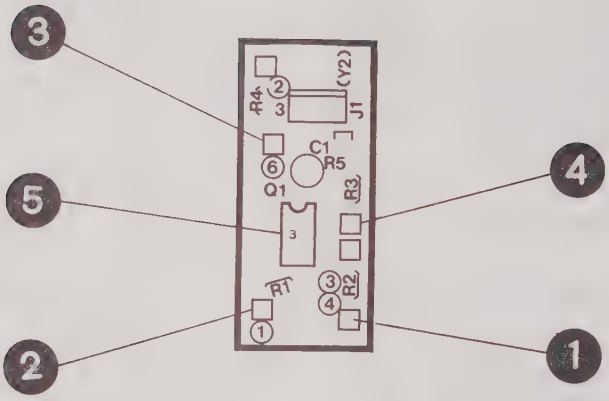


Fig. 3-23 Z13 Optical Connector Sensor PC Board Component Layout

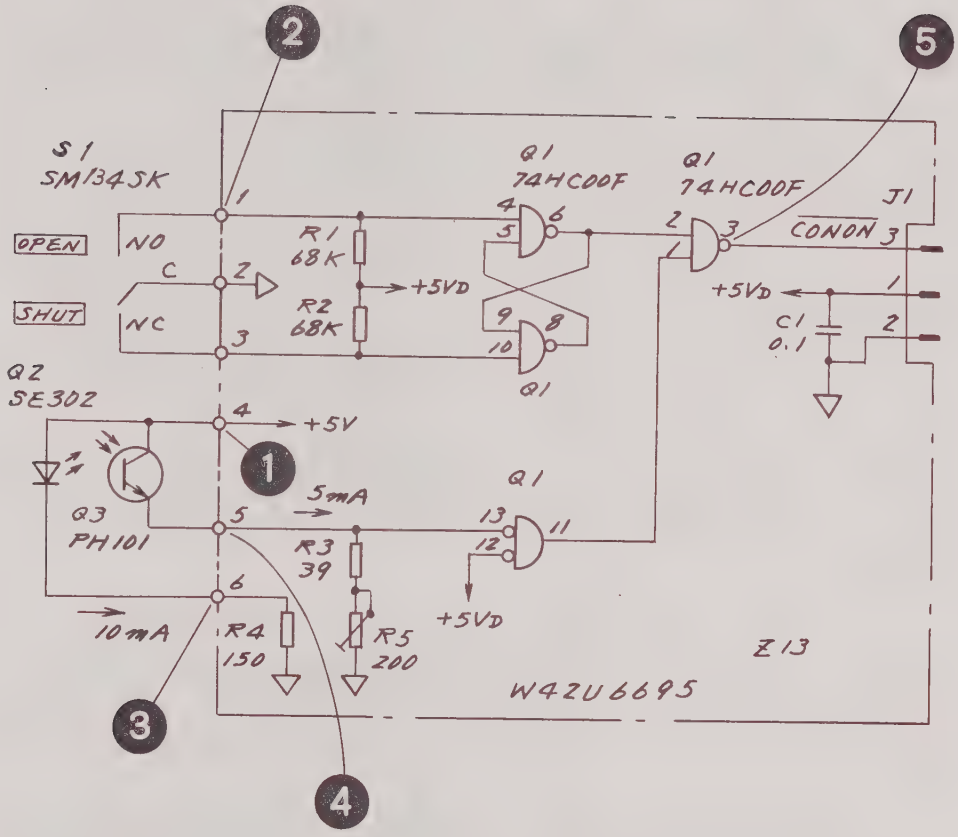


Fig. 3-24 Z13 Optical Connector Sensor
Circuit Diagram
W4W9551

11

3.6.7 Z16 unit motherboard

(1) Circuit description

This PC board relays the signals from the MW910A and the other PC boards in the plug-in unit.

DIP switch (S1) sets the plug-in unit identification (MH937A, MH938A, MH939A, or MH955A).

Q14 and Q16 set the LD operation pulse width and timing with the trigger signal from the MW910A, and supply the set pulse to the Z8 LD Driver. Q15, Q17, Q18, Q19, Q20, and Q25 generate the timing signal that controls the AO switch that performs the Laser transmission and reception, and the mask function to prevent Fresnel reflection. The signal is sent to the Z9 AO Driver.

Of the signals sent to the Z11 AMP from the MW910A, the digital and analog system signals are isolated by the photocouplers consisting of Q37 through Q42.

This PC board also contains an LED light-source power supply and LED drive circuits. With the trigger signal from the MW910A, K2 operates Q62, Q63, and Q67 that supply power to the LED light-source drive circuit.

The LED drive pulse isolated by Q70 is shaped, amplified to the LED drive current pulse, and supplied to the Z21 LED module by the CM circuit.

(2) Troubelshooting and repair

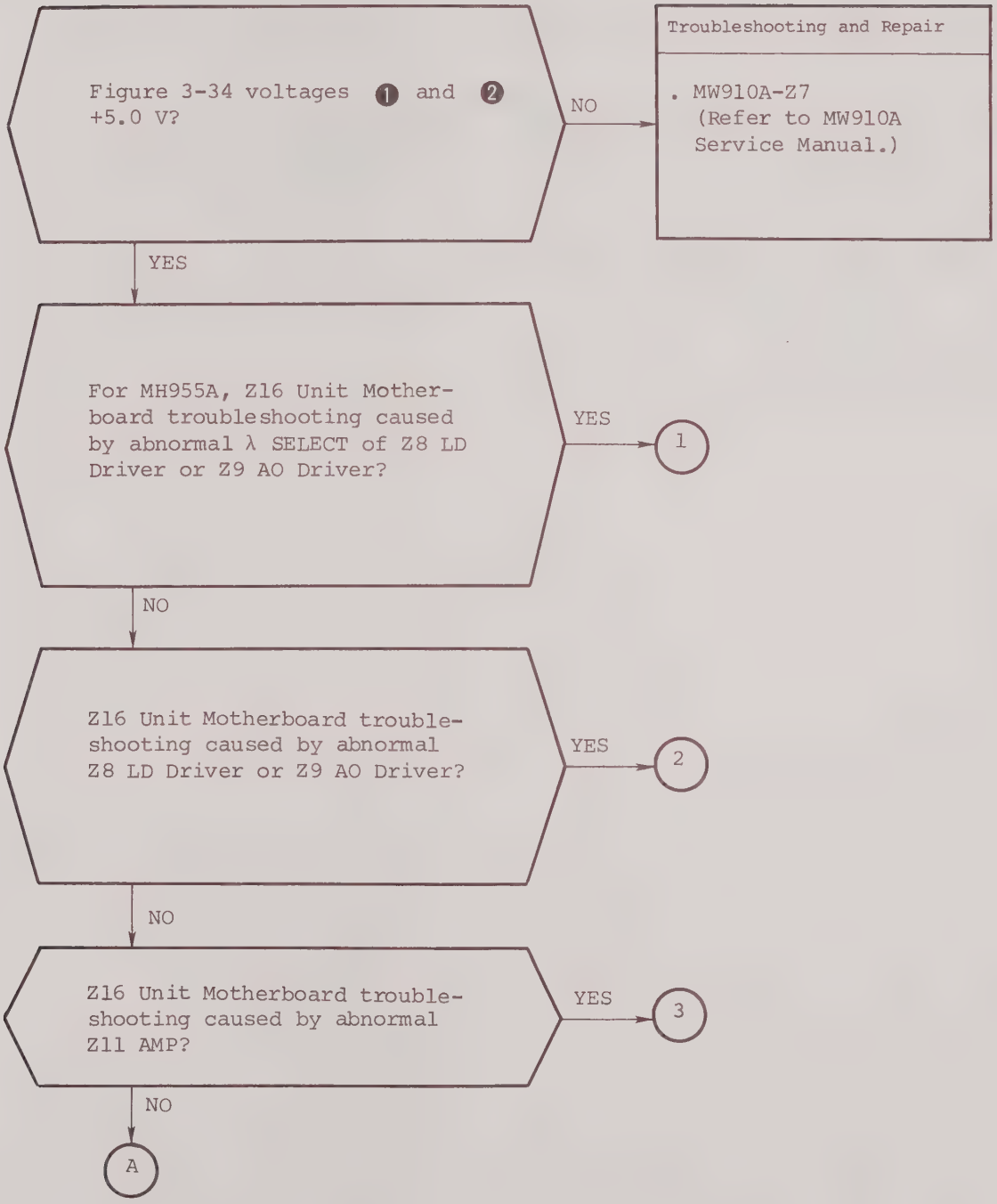
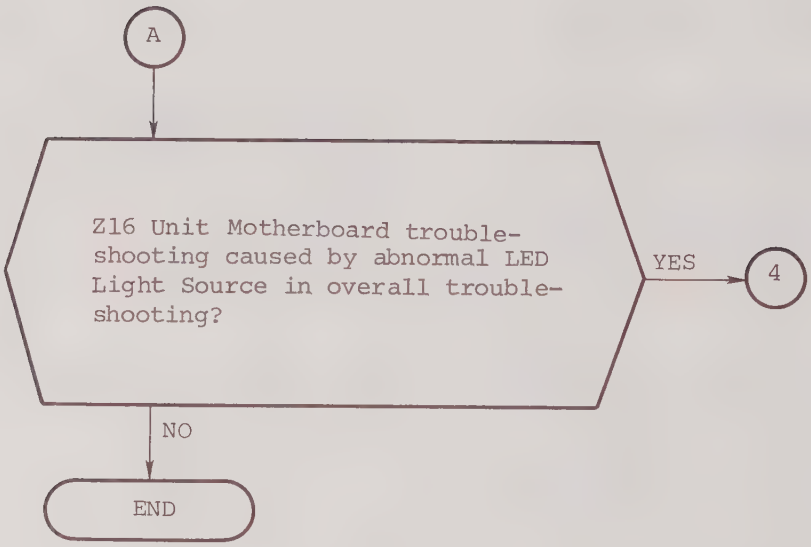
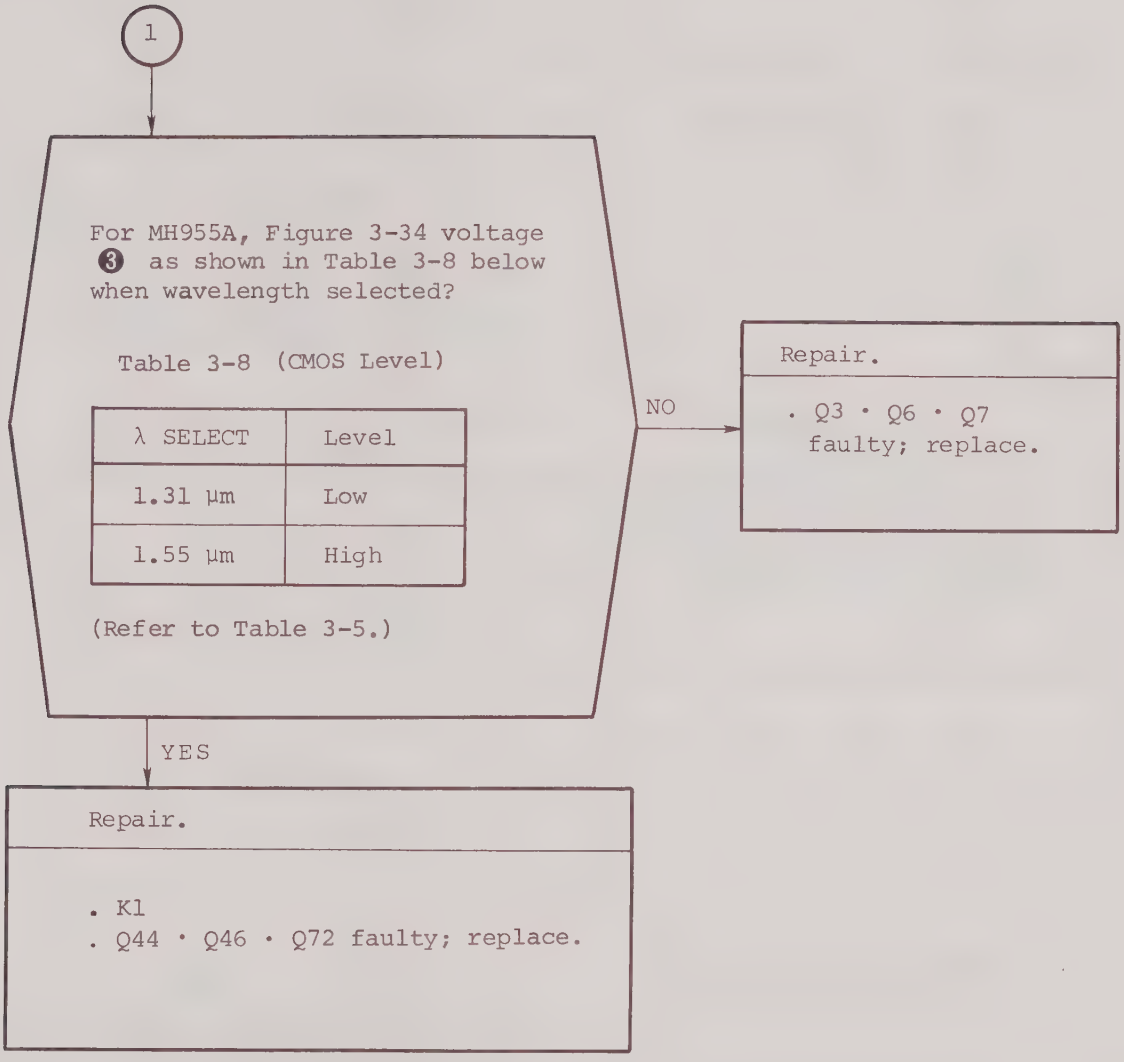


Figure 3-34 voltages ❶ and ❷ +5.0 V?
NO
Troubleshooting and Repair
. MW910A-Z7 (Refer to MW910A Service Manual.)
YES
For MH955A, Z16 Unit Motherboard troubleshooting caused by abnormal λ SELECT of Z8 LD Driver or Z9 AO Driver?
YES
1
NO
Z16 Unit Motherboard troubleshooting caused by abnormal Z8 LD Driver or Z9 AO Driver?
YES
2
NO
Z16 Unit Motherboard troubleshooting caused by abnormal Z11 AMP?
YES
3
NO
A


A
Z16 Unit Motherboard trouble-shooting caused by abnormal LED Light Source in overall trouble-shooting?
YES
4
NO
END


1
For MH955A, Figure 3-34 voltage ❸ as shown in Table 3-8 below when wavelength selected?
Table 3-8 (CMOS Level)
λ SELECT
Level
1.31 µm
Low
1.55 µm
High
(Refer to Table 3-5.)
NO
Repair.
. Q3 · Q6 · Q7 faulty; replace.
YES
Repair.
. K1
. Q44 · Q46 · Q72 faulty; replace.

2

Figure 3-34 timing ❹ through ❿ as shown in Fig. 3-25.

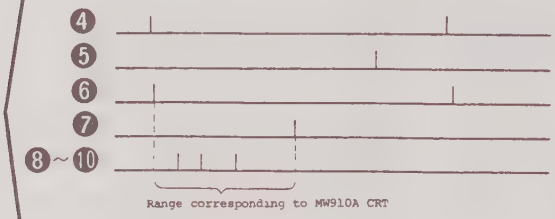


Fig. 3-25

Displays ❽ through ❿ show the pulses that appear at the oscilloscope position corresponding to the position at which the masks are applied on the MW910A CRT waveform.

NO

Troubleshoot and Repair.

- MW910A-Z4 (Refer to MW910A Service Manual.)

YES

Connect test fiber to OUTPUT.

Figure 3-34 voltage ⓫ as shown in table below with OUTPUT [ON/OFF] key?

Table 3-9 (CMOS Level)

OUTPUT ON/OFF	Level
ON	Low
OFF	High

(Refer to Table 3-5.)

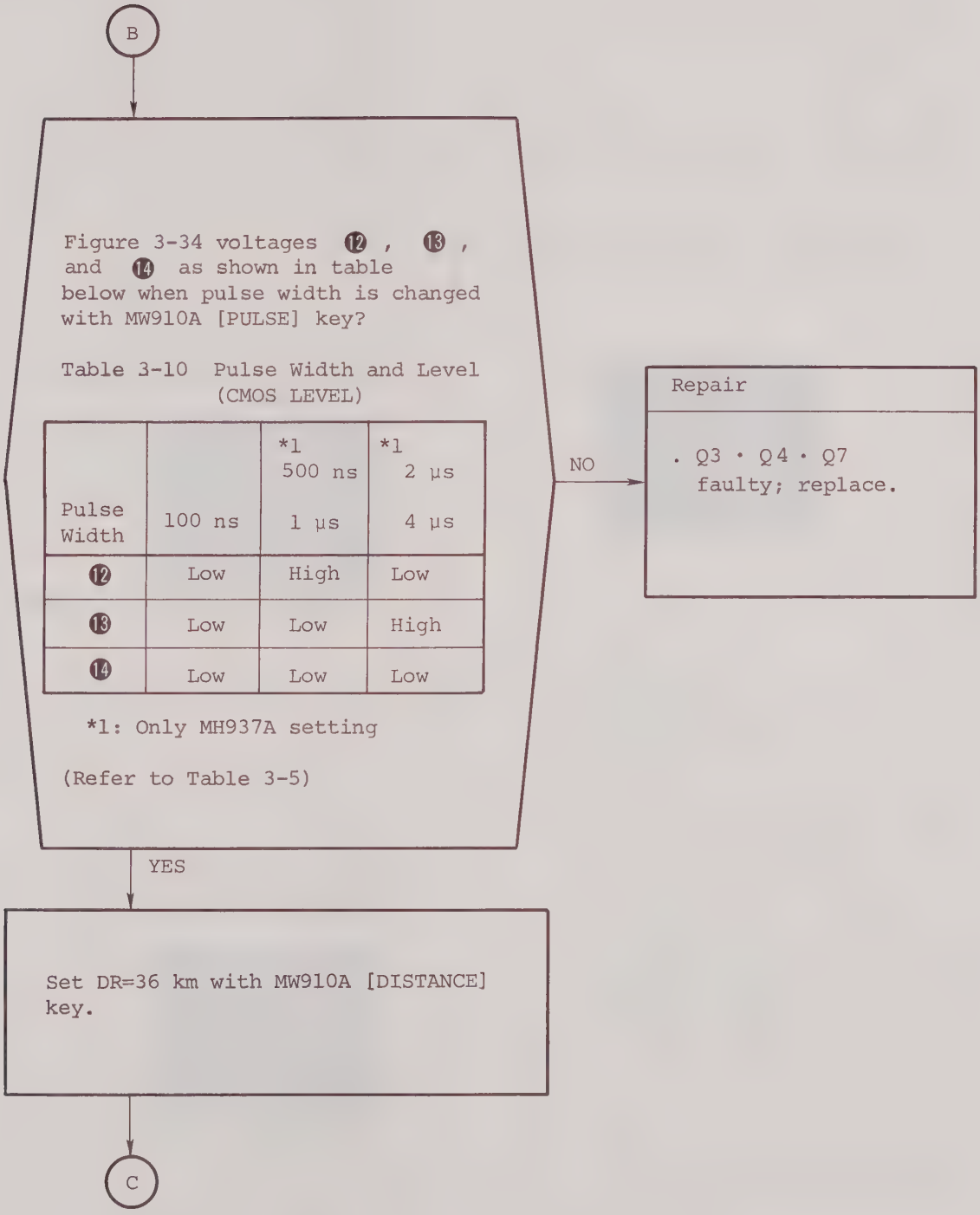
NO

Troubleshoot and Repair

- MW910A-Z1 (Refer to MW910A Service Manual.)

YES

B


B
Figure 3-34 voltages ⑫ , ⑬ , and ⑭ as shown in table below when pulse width is changed with MW910A [PULSE] key?
Table 3-10 Pulse Width and Level (CMOS LEVEL)
Pulse Width
100 ns
*1 500 ns 1 µs
*1 2 µs 4 µs
⑫ Low High Low
⑬ Low Low High
⑭ Low Low Low
*1: Only MH937A setting
(Refer to Table 3-5)
NO
Repair
. Q3 . Q4 . Q7 faulty; replace.
YES
Set DR=36 km with MW910A [DISTANCE] key.
C

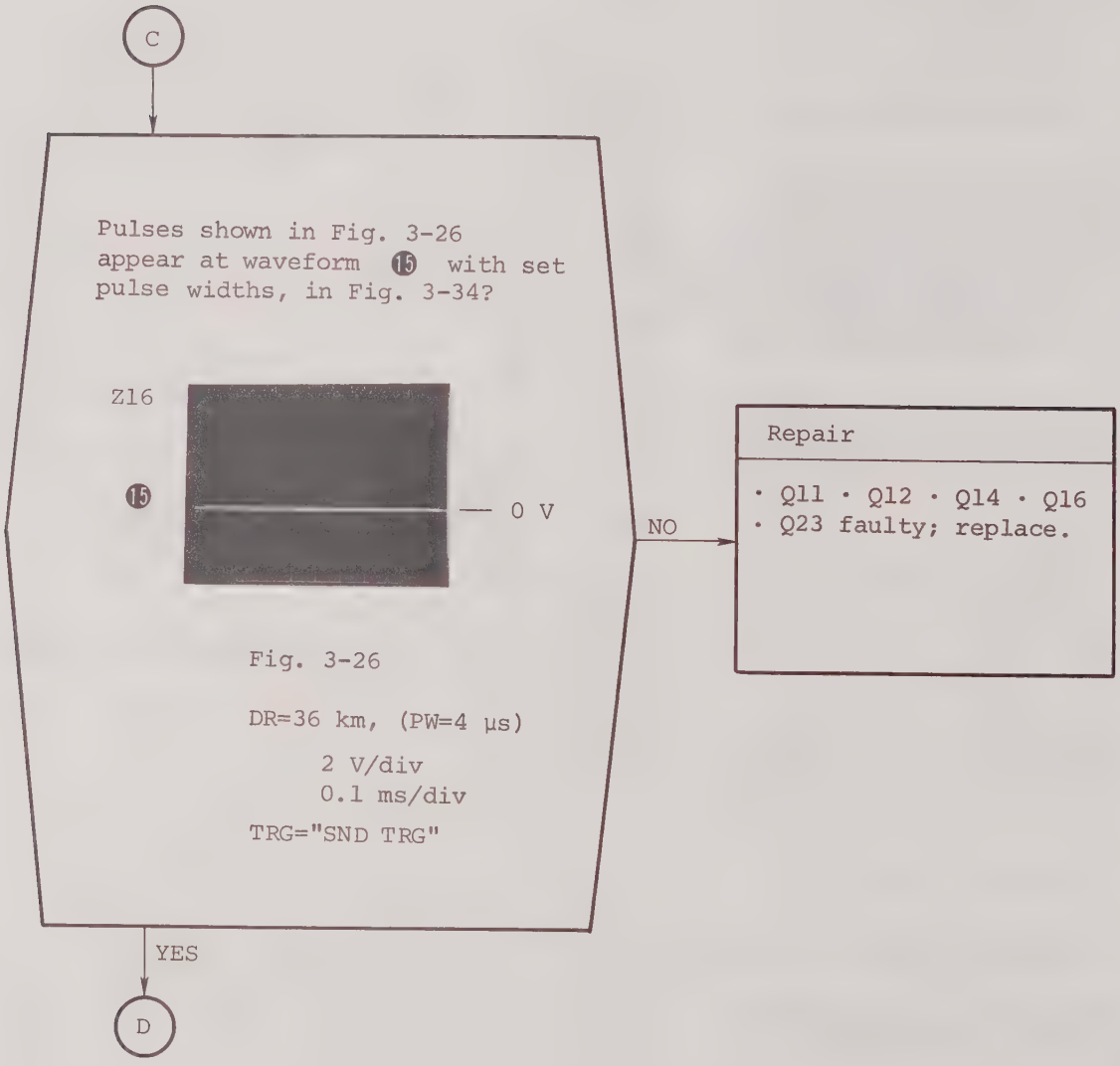


Fig. 3-26

DR=36 km, (PW=4 µs)

2 V/div
0.1 ms/div

TRG="SND TRG"

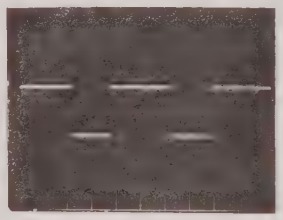
D

Set DR=18 km with MW910A [DISTANCE] key.

Figure 3-34 waveform ⑯ as shown in Fig. 3-27 below?

Z16

⑯



— 0 V

NO

Repair

· Q12 · Q13 · Q19 · Q20
· Q23 faulty; replace.

Fig. 3-27

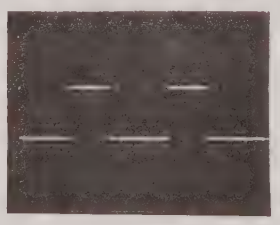
DR=18 km
H-SHIFT=0
2 V/div
50 µs/div
TRG="SND TRG"

YES

Figure 3-34 waveform ⑰ as shown in Fig. 3-28 below?

Z16

⑰



— 0 V

NO

Repair

· Q15 · Q16 · Q17 · Q18
· Q20 · Q25 · Q27 faulty; replace

Fig. 3-28

DR=18 km
2 V/div
50 µs/div

YES

END

3

Figure 3-34 waveform ⑱ as shown in Fig. 3-29?

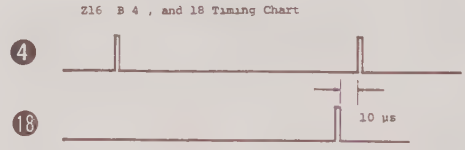


Fig. 3-29 Z16 (B) ④ and ⑱ Timeing Chart

NO → Troubleshoot and Repair

- MW910A-Z4 (Refer to MW910A Service Manual.)

YES

Figure 3-34 waveforms at ⑲ through ㉒ as shown in figs below?

Z16

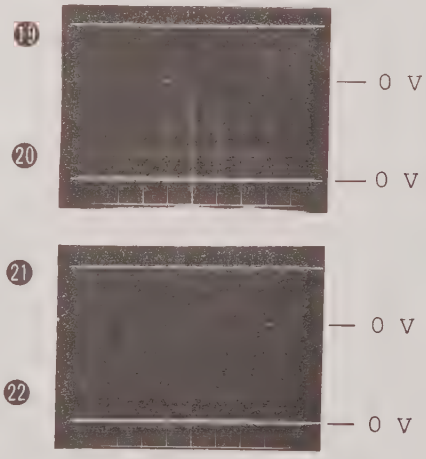


Fig. 3-30

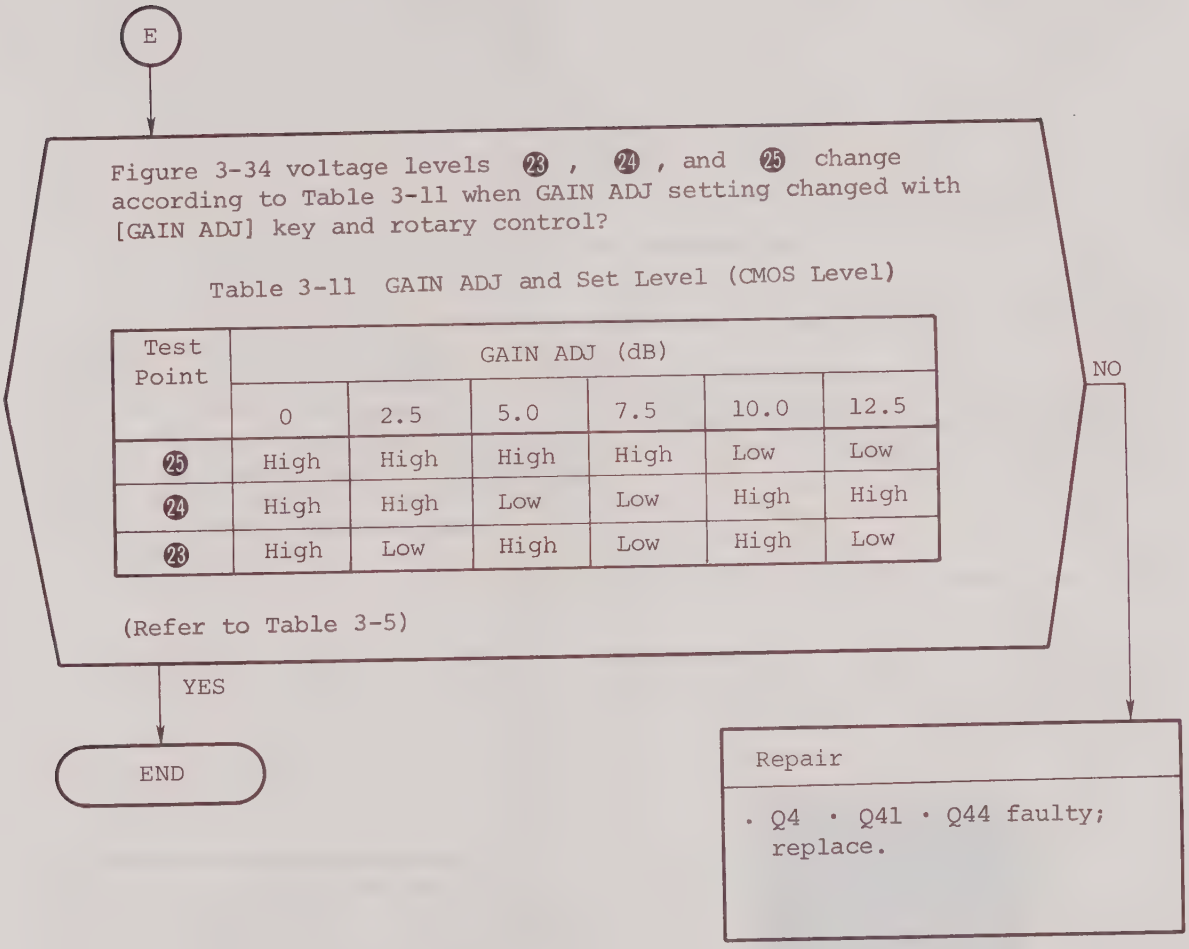
DR=18 km
2 V/div
50 µs/div
EXT TRG="SND TRG"

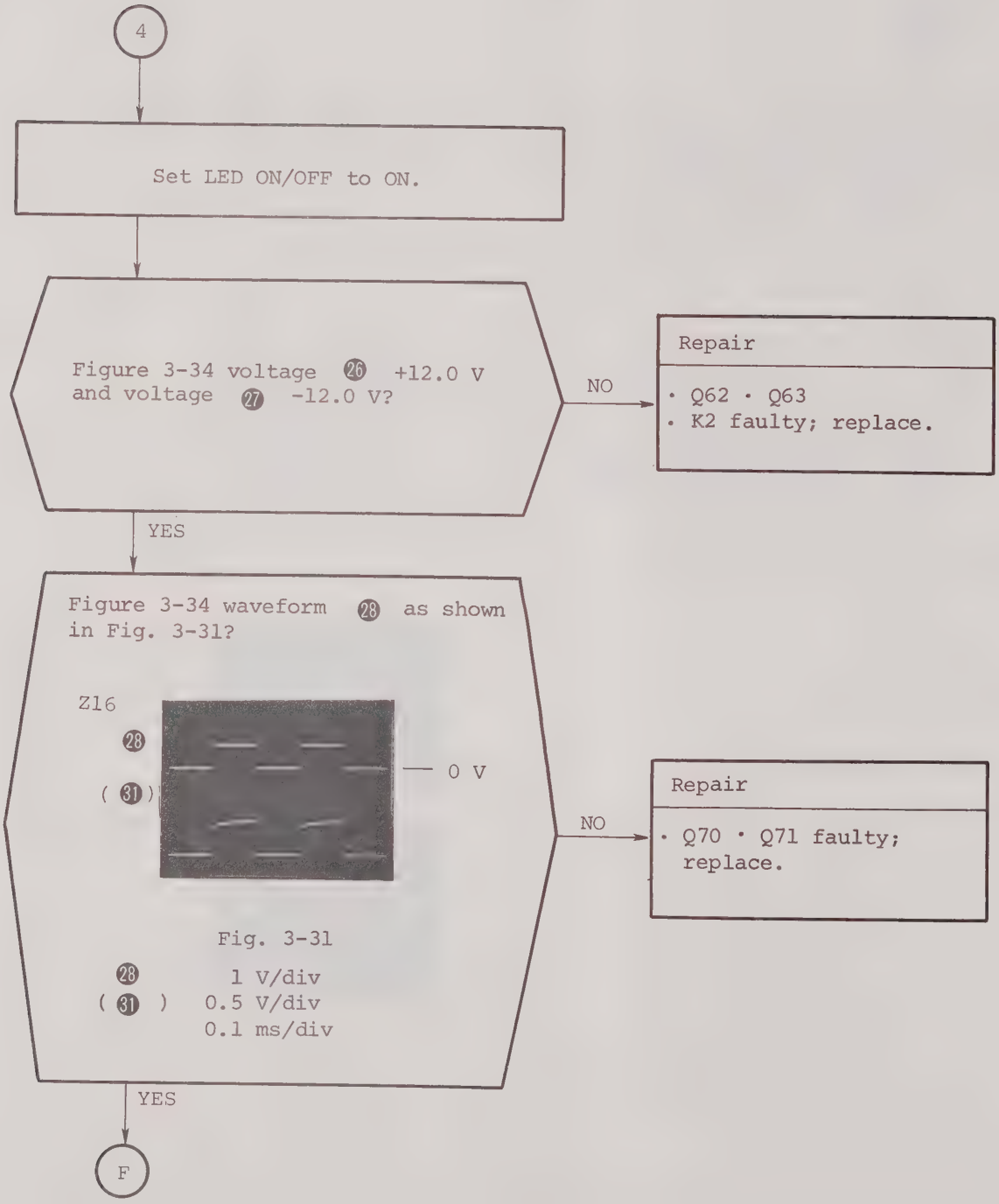
NO → Repair

- Faulty Q31 through Q40; replace. (Refer to Fig. 3-35.)

YES

E


E
Figure 3-34 voltage levels ㉓ , ㉔ , and ㉕ change according to Table 3-11 when GAIN ADJ setting changed with [GAIN ADJ] key and rotary control?
Table 3-11 GAIN ADJ and Set Level (CMOS Level)
Test Point
GAIN ADJ (dB)
0
2.5
5.0
7.5
10.0
12.5
㉕ High High High High Low Low
㉔ High High Low Low High High
㉓ High Low High Low High Low
(Refer to Table 3-5)
NO
YES
END
Repair
· Q4 · Q41 · Q44 faulty; replace.


4
Set LED ON/OFF to ON.
Figure 3-34 voltage ㉖ +12.0 V and voltage ㉗ -12.0 V?
NO
Repair
· Q62 · Q63
· K2 faulty; replace.
YES
Figure 3-34 waveform ㉘ as shown in Fig. 3-31?
Z16
㉘
(㉛)
0 V
NO
Repair
· Q70 · Q71 faulty; replace.
Fig. 3-31
㉘ 1 V/div
(㉛) 0.5 V/div
0.1 ms/div
YES
F

F

Figure 3-34 waveforms ㉙ and ㉚ as shown in Fig. 3-32?

Z16

㉙ — 0 V

㉚ — 0 V

NO →

Repair

- Q47 faulty; replace.
- Q51 · Q52 · Q53 · Q54 faulty; check and replace faulty parts.

Fig. 3-32

2 V/div
0.1 µs/div
EXT TRG="SND TRG"

YES ↓

Figure 3-34 waveform ㉛ as shown in Fig. 3-33?

Z16

㉛

— 0 V

NO →

Repair

- Q55 · Q56 · Q57
- Q58 faulty; check, replace faulty parts.
- Q69 faulty; replace.

Fig. 3-33

2 V/div
0.1 µs/div
EXT TRG="SND TRG"

YES ↓

- Z22 LED Module faulty; replace.

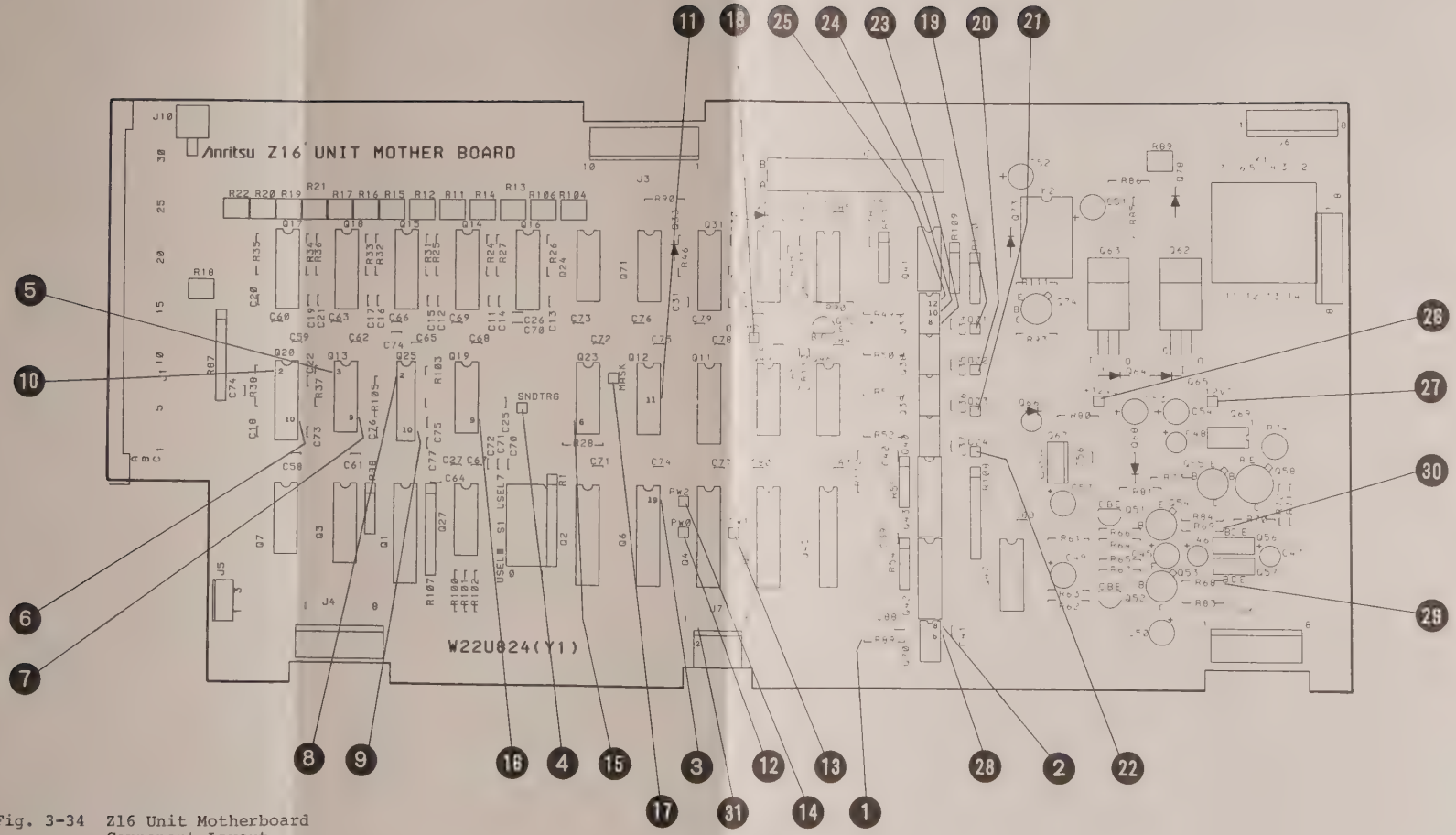
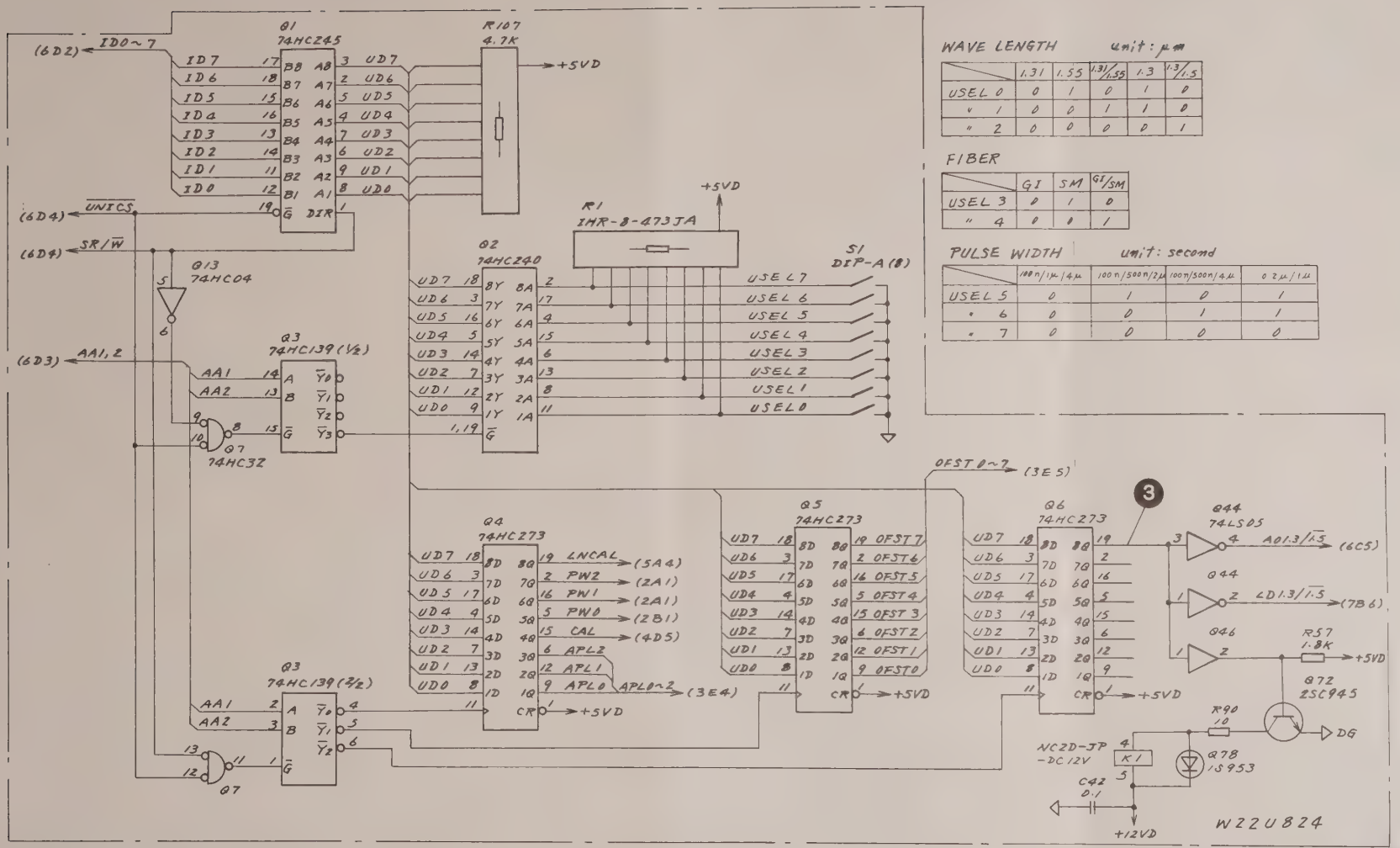


Fig. 3-34 Z16 Unit Motherboard
Component Layout



WAVE LENGTH unit: μm

	1.31	1.55	1.3/1.55	1.3	1.3/1.5
USEL 0	0	1	0	1	0
" 1	0	0	1	1	0
" 2	0	0	0	0	1

FIBER

	GI	SM	GI/SM
USEL 3	0	1	0
" 4	0	0	1

PULSE WIDTH unit: second

	100n/1μ/4μ	100n/500n/2μ	100n/500n/4μ	0.2μ/1μ
USEL 5	0	1	0	1
" 6	0	0	1	1
" 7	0	0	0	0

Parts Lists	
	W4W9553 (MH937A)
	W4W9581 (MH938A, MH939A)
	W4W9592 (MH955A)

Fig. 3-35(a)
Z16 Unit Motherboard
Circuit Diagram

W3W3771 1/7

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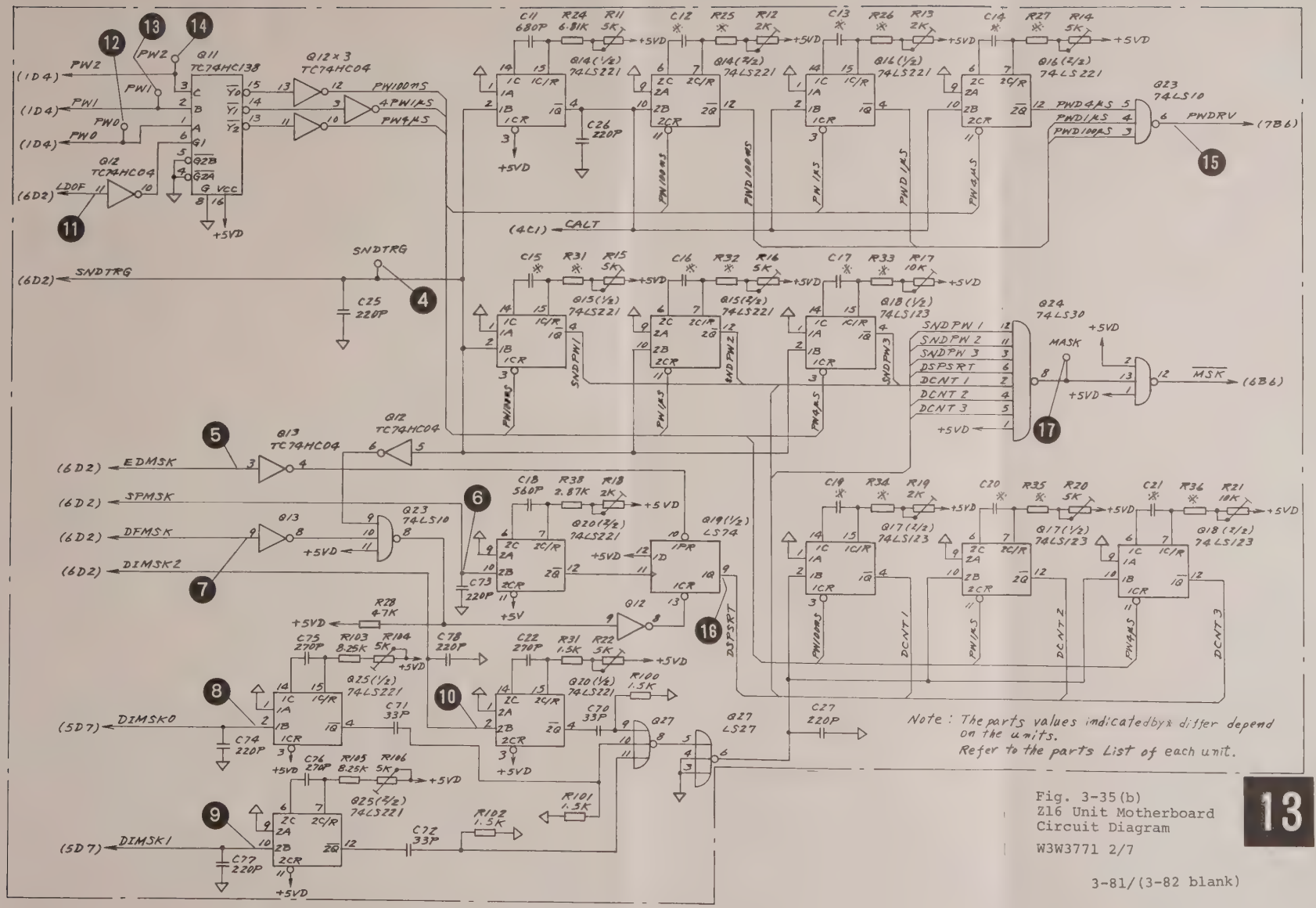


Fig. 3-35(b)
Z16 Unit Motherboard
Circuit Diagram

W3W3771 2/7

13

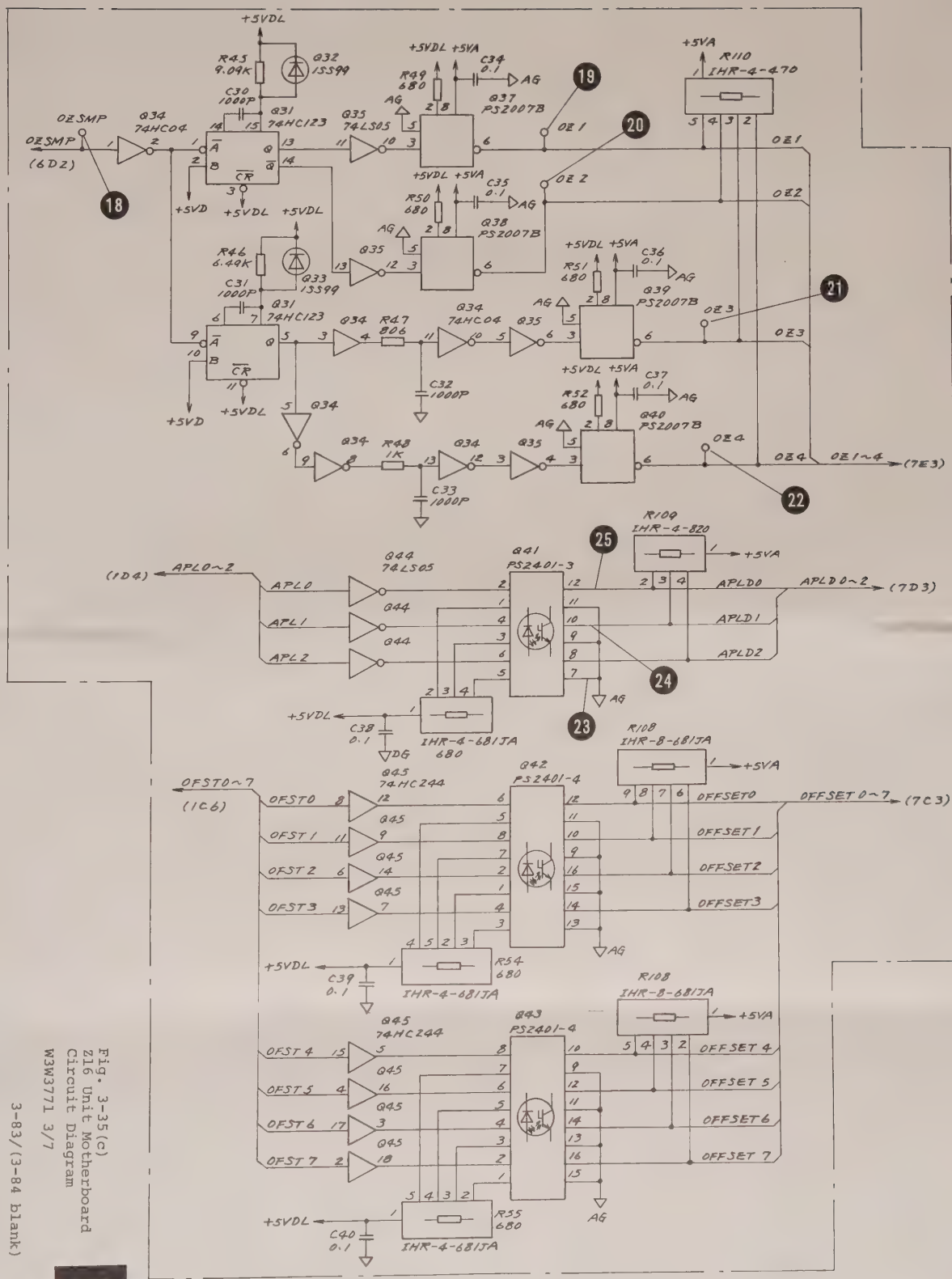


Fig. 3-35(c)
Z16 Unit Motherboard
Circuit Diagram
W3W3771 3/7

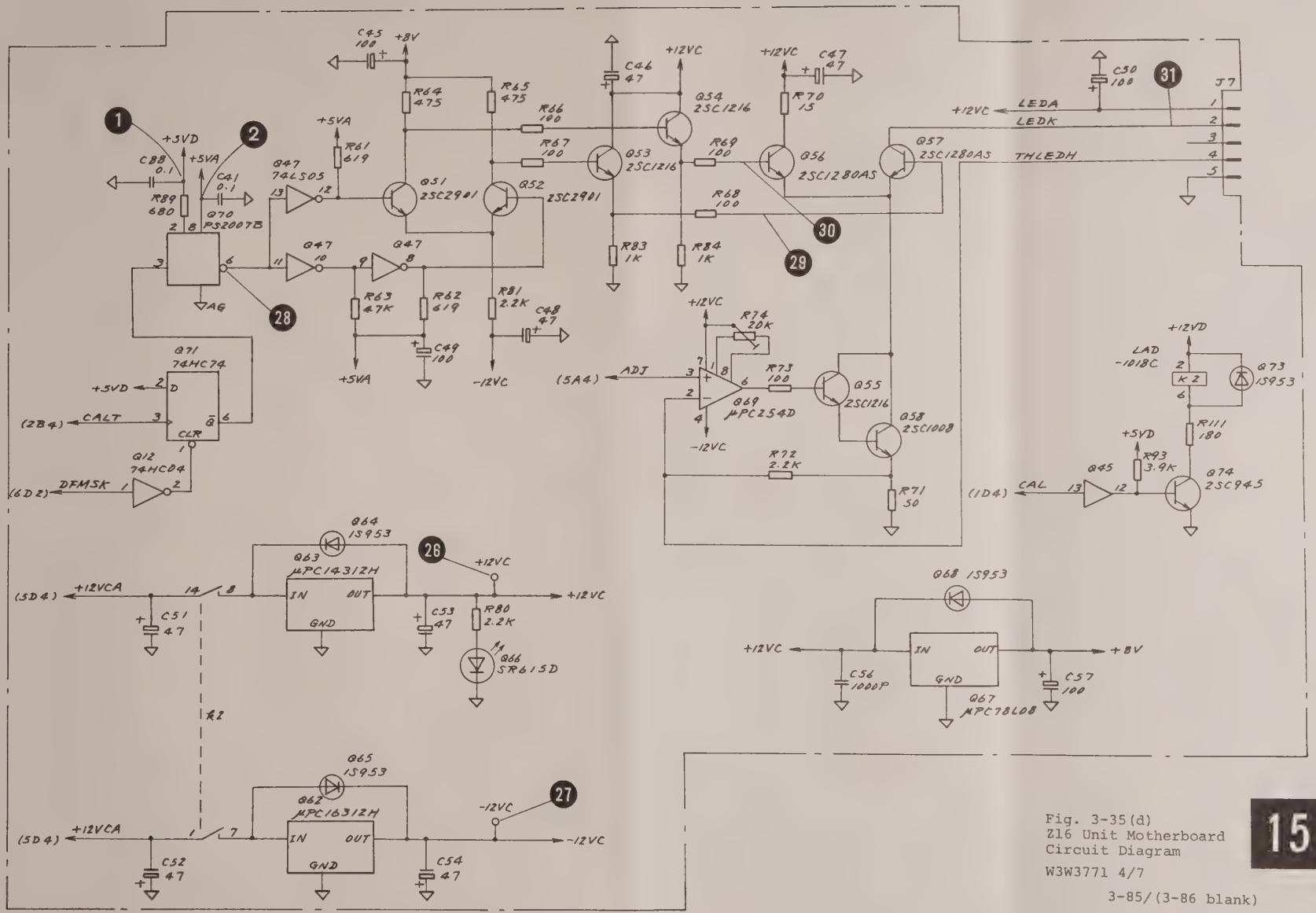
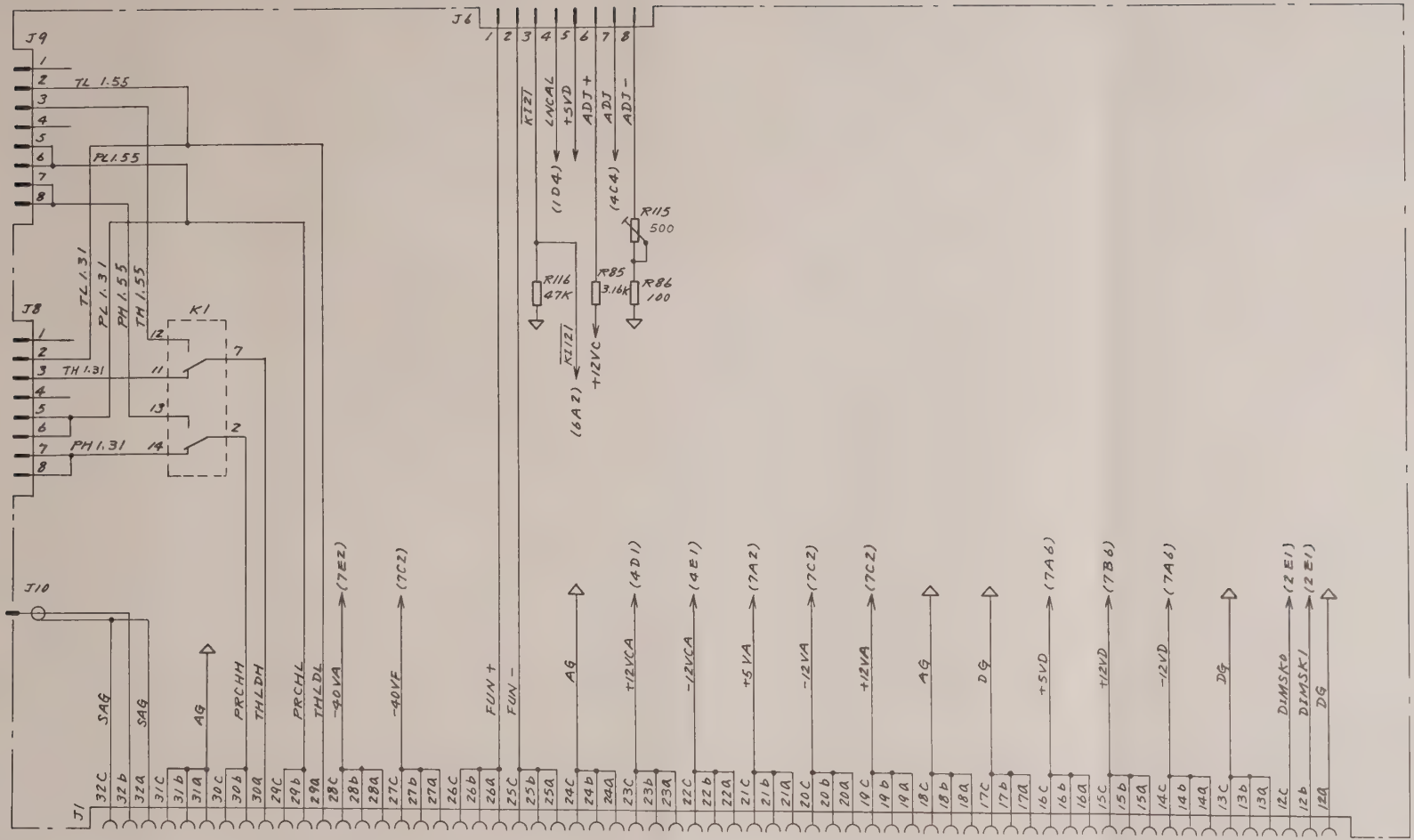


Fig. 3-35(d)
Z16 Unit Motherboard
Circuit Diagram

W3W3771 4/7



Note: K1 relay pins, 7 & 11, and 2 & 14 are short circuits, except in the MH955A.

Fig. 3-35(e)
Z16 Unit Motherboard
Circuit Diagram
W3W3771 5/7

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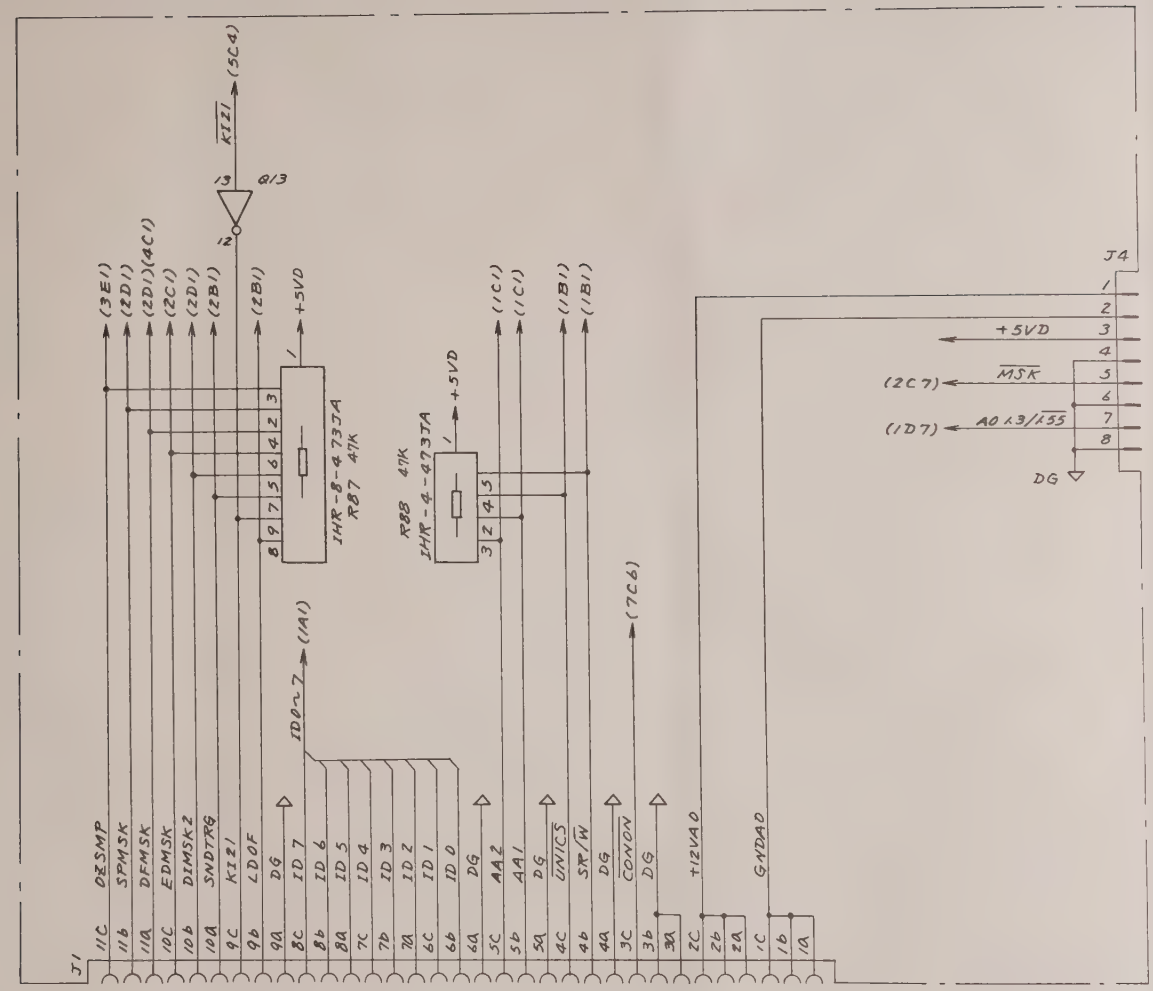
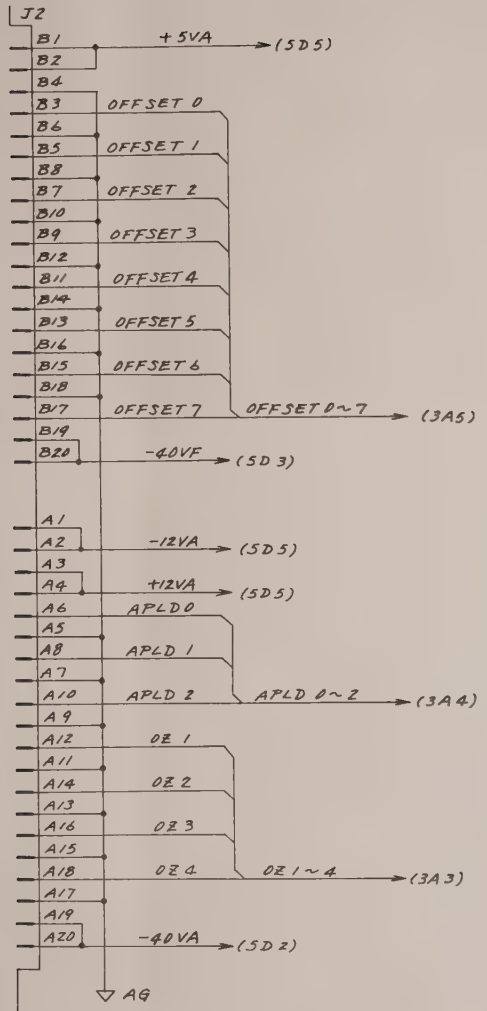
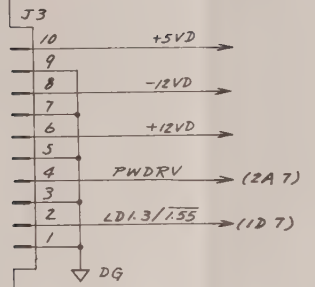


Fig. 3-35(f)
Z16 Unit Motherboard
Circuit Diagram

W3W3771 6/7





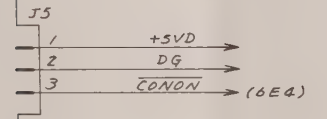


Fig. 3-35(g)
Z16 Unit Motherboard
Circuit Diagram

W3W3771 7/7

Table 4-1 Adjustment Points and Contents

No.	P.C Board	Adjustment Point	Equipment	Adjustment Contents (associated paragraph)
1	Z13 Optical-Connector Sensor	Z13-R5	No.1 Digital multimeter	Adjustment for detecting the test fiber connection (Paragraph 4.2.1)
2	Z8 LD Driver	Z8-R12	No.2 Oscillo-scope	LD drive current adjust-ment (Paragraph 4.2.2)
3	LED Light Source (Z16 Unit Motherboard)	Z16-R74	No.6 Optical power meter & sensor No.9 Optical fiber 2	LED light-source drive current adjustment (Paragraph 4.2.4)
4	Z11 AMP	Z11-R3 Z11-R27 Z11-R29 Z11-R30 Z11-R38 Z11-R46 Z11-R52 Z11-R56 Z11-R57 Z11-R59 Z11-R62 Z11-R95 Z11-R106 Z11-R119 Z11-R180 Z11-R187 Z11-R200 Z11-R201	No.2 Oscilloscope No.7 Optical attenuator No.11 Stabilized light source	APD bias adjustment Amp power supply voltage, offset bias, balance, and addition noise adjustment (Paragraph 4.2.5)

Table 4-1 Adjustment Points and Contents (Continued)

No.	P.C Board	Adjustment Point	Equipment	Adjustment Contents (associated paragraph)
5	Z16 unit motherboard (Overall adjustment)	Z16-R11 through R22 Z16-R104 Z16-R106	No.2 Oscilloscope No.10 Waveform monitor No.8 Optical Fiber 1 No.9 Optical Fiber 2	LD drive pulse width and timing adjustments AO switch timing adjustment (Paragraph 4.3)

Note: *1 only MH955A adjustment point

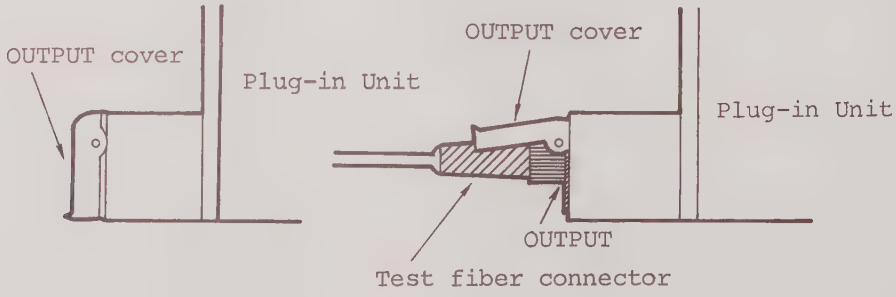
4.2 Adjustments

4.2.1 Z13 optical-connector sensor

Setup:

Check that Z13-J1 and Z16-J5 are connected as shown in Fig. 3-5.

Step	Procedure
1	Disconnect the test fiber from the plug-in unit OUTPUT connector. See Fig. 4-1(a).
2	Measure Fig. 3-23 voltage ❹ with the digital multimeter and confirm that it indicates 3.15 V or higher.
3	Open the OUTPUT cover and connect the test fiber to the OUTPUT and set Fig. 3-23 voltage ❹ to 1.3 V or less with the Z13 variable resistor R5. See Fig. 4-1(b).



(a) Unconnected (b) Connected

Fig. 4-1 Test Fiber Connection

4.2.2 Z8 LD driver

Adjust a 400 mA current necessary so that the LD radiates by using a dummy resistor (10 Ω).

Setup:

Check that Z8-J3 and Z16-J3 are connected as shown in Fig. 3-5. Disconnect Z8 J1 and J2 from the Z23 LD/AO module-J1 and J2, respectively.

Set the DIC switch S1 to the B side (R34 side: see Fig. 4-2).

Set DR=36 km with the MW910A [DISTANCE] key and PW=4 μs with the [PULSE] key.

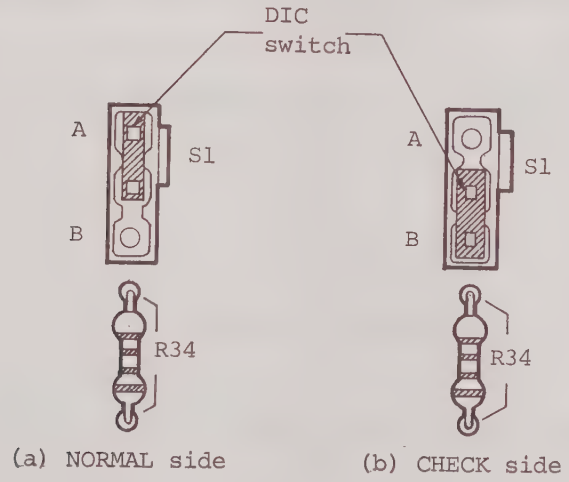


Fig. 4-2 S1 Switching

Step	Procedure
1	Observe the waveform of test point ❺ (PWD) with the oscilloscope and check that the pulse level is the same level as shown in Fig. 4-3.

Fig. 4-3 Test Point ❺ Waveform

2 Observe the waveform of test point ❻ (LDH) and check that the oscilloscope shows the -4 V pulse as shown in Fig. 4-4.

Fig. 4-4 Test Point ❻ Waveform

4.2.3 Z9 AO DR PC Board

Consult to the agent office in your area or Anritsu's factory service department for the Z9 AO DR adjustment.

4.2.4 LED light source (Z16 Unit Motherboard)

The LED drive circuit is located on Z16 and Z3, and drives the Z22 LED module.

The LED light-source drive current is adjusted here.

Setup:

Install the Z16, Z3 KEY-2, and Z22 LED module in the plug-in unit cabinet and connect as shown in Fig. 3-5.

(1) LED output power adjustment

Step	Procedure
1	Turn the MW910A power to ON and connect Optical Fiber 2 to the LED OUT, then connect the optical power meter and sensor as shown in Fig. 4-5.
2	When the LED light-source wavelength band is 1.3 μm, the optical power-meter CAL factor is 0.00. However, when the LED light-source wavelength band is 1.5 μm, set the optical power-meter CAL factor to the value indicated on the optical-sensor calibration curve and read the optical power meter display value.
3	Turn the LEVEL ADJ control to the center (Fig. 4-5) and adjust the variable resistor R115 so that the LED output power value corresponds to the value listed in Table 4-2.

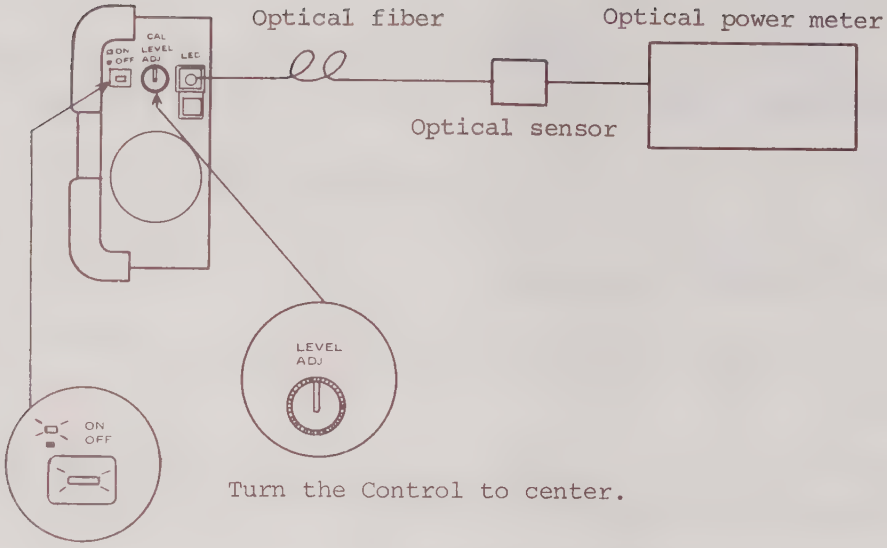


Fig. 4-5 LED Output Power Adjustment Setup

Table 4-2 Plug-in Unit LED Output Power and Wavelength

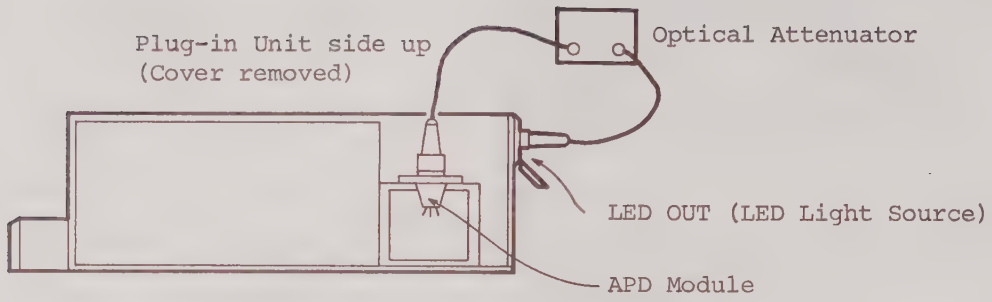
Plug-in Unit	LED Wavelength Band	LED Output Power
MH937A	1.3 μm	-43 dBm
MH938A	1.3 μm	-43 dBm
MH939A	1.5 μm	-45 dBm
MH955A	1.3 μm	-43 dBm

4.2.5 Z11 AMP PC board

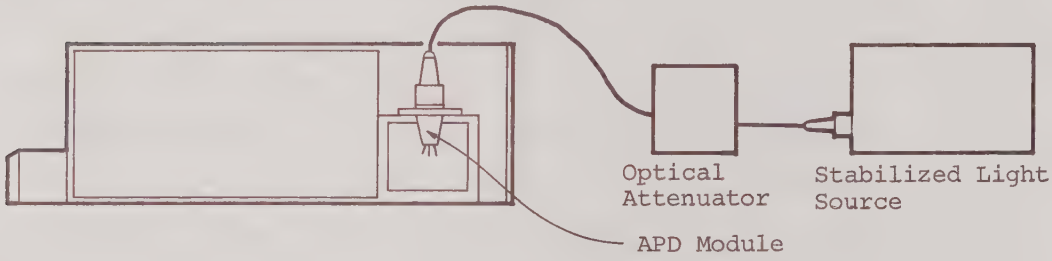
APD, offset, and main amp biases are adjusted on this PC board.

(1) APD bias adjustment

Step	Procedure
1	First, turn variable resistors R29 and R30 fully counterclockwise.
2	Set S1 to the B side and S2 to the A side.
3	Adjust the voltage between ㉙ and ㉚ of Fig. 3-22 to 10 ±0.1 V with variable resistor R27.
4	Without inputting the light to the APD, adjust the voltage of test point ㉛ to 0 V with variable resistor R3. Adjust the voltage of test point ㉜ to 0 V with variable resistor R38 (A1).
5	Input the light sent from the LED light source or a stabilized light source to the APD through the optical attenuator (see Fig. 4-6).
6	Measure the voltage of test point ㉜ , and adjust variable resistors R29 (rough adjustment) and R30 (fine adjustment) to obtain a voltage of 10 times the measured value. However, do not turn the optical attenuator so that the voltage of test point ㉜ is saturated.



(a) LED light source



(b) Without LED light source

Fig. 4-6 APD Bias Adjustment Setup

(2) Offset bias adjustment

Step	Procedure
1	Remove S4 and set the circuit to the open state. Adjust the variable resistors from 1 through 8 in the order listed in Table 4-3 to obtain 0 V at each test point ㉝ through ㊵ in Fig. 3-21.

Table 4-3 Offset Bias Adjustment

Adjustment Order	Test Point	Adjustment Variable Resistor
1	㉝ (OF3)	R200
2	㉞ (OF4)	R201
3	㉟ (OF5)	R202
4	㊱ (A2)	R46 (A2)
5	㊲ (A3)	R52 (A3)
6	㊳ (A4)	R56 (A4)
7	㊴ (OF1)	R57 (OF1)
8	㊵ (OF2)	R59 (OF2)

2 Short circuit S4. While observing the voltage of test point ㊲ , adjust variable resistor R60 (ZG) so that the voltage of test point ㊲ does not change even when changing the variable resistor R202 slightly in Step 1.

3 Remove S4 and reset variable resistor R202 to the step 1 state, then short circuit S4.

(3) Main AMP balance adjustment

Step	Procedure
1	Turn off the MW910A power, set the MW910A-Z1 S1 to the B side, and turn on the power.
2	Adjust the voltage of test point ⑮ of Fig. 3-22 to +6.25 V with variable resistor R165.
3	Press the MW910A [MARKER] key.
4	Adjust the voltage of test point ㊶ of Fig. 3-22 to -2 ±0.01 V with variable resistor R187.
5	After pressing the MW910A [GAIN ADJ] key, adjust the voltage of test point ㊶ to +2 ±0.01 V with variable resistor R186.
6	After pressing the MW910A [MASK] key, check that the voltage of test point ㊶ is 0 V.
7	Remove S5. Adjust each resistor so that the potential difference between the test points shown in Table 4-4 is 0 V.

Table 4-4 Main AMP Balance Adjustment

Adjustment Order	Between Test Points	Adjustment Variable Resistor
1	㊷ - ㊸	R95 (BAL1)
2	㊹ - ㊺	R106 (BAL2)
3	㊻ - ㊼	R119 (BAL3)

8	Adjust the voltage of test point ㉘ to -0.5 V with variable resistor R139 (OFST3).

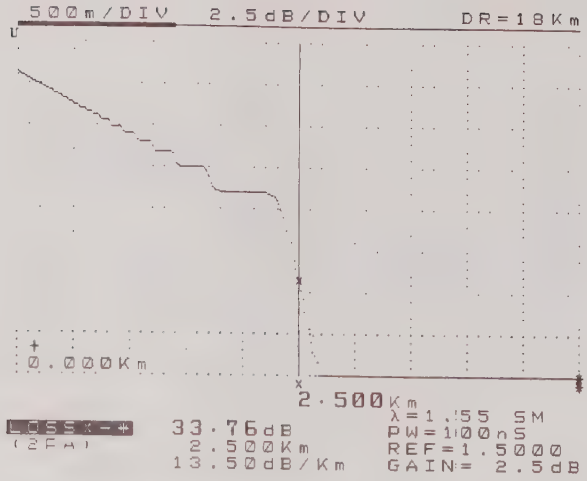
(cont.)

Step	Procedure
9	Set S5 to the A side.
10	After turning off the power, set the MW910A-Z1 S1 to the A side and turn on the power.

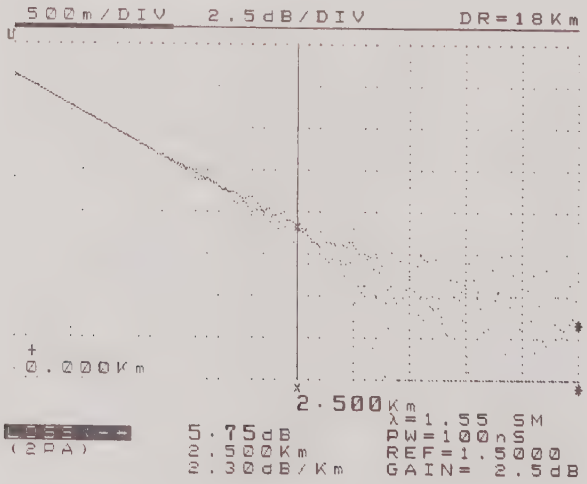
(4) White noise level adjustment

Step	Procedure
1	After turning off the power, set S5 to the B side.
2	Connect Z11-J3 and MW910A-Z4-J4 with the No. 13 coaxial cord, and turn on the power.
3	Set OUTPUT to ON and, while observing the CRT display, adjust the waveform shown in Fig. 4-7 (a) or (b) to the waveform (c) with variable resistor R180.
4	After turning of the power, set S5 to the A side and disconnect Z11-J3 and MW910A-Z2-J4.

(a) Little noise



(b) Much noise



(c) Suitable noise

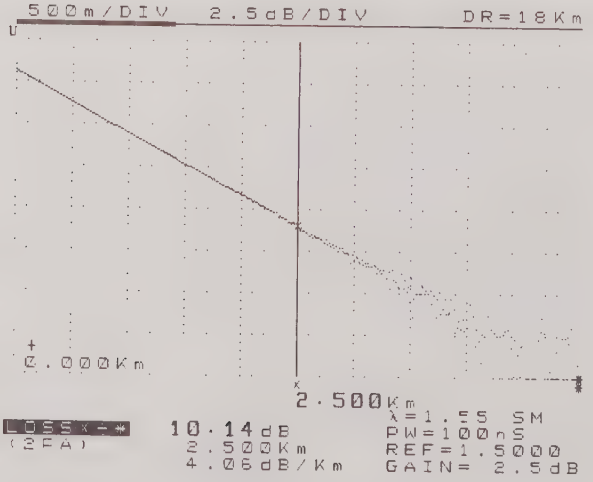


Fig. 4-7 White Nose Level Check Displays

4.3 Z16 Unit Motherboard

This Z16 Unit Motherboard adjustment adjusts the laser-output pulse width and its timing and the A/O switch control timing.

All the adjustment points are on the Z16 Unit Motherboard (see Fig. 3-34).

4.3.1 Laser-output pulse width and timing adjustments

(1) Output pulse with adjustment

Step	Procedure
1	Set up the equipment as shown in Fig. 4-9.
2	While observing the laser output with a waveform monitor and oscilloscope, adjust the variable resistors of Table 4-5 so that the display pulse width and output pulse width become the same when the pulse width is set with [PULSE] key. Note that the pulse width here means the pulse with at a half amplitude of the pulse waveform (see Fig. 4-8).

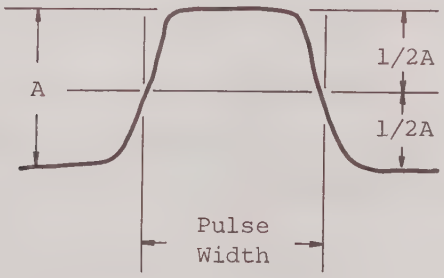


Fig. 4-8 Pulse Width

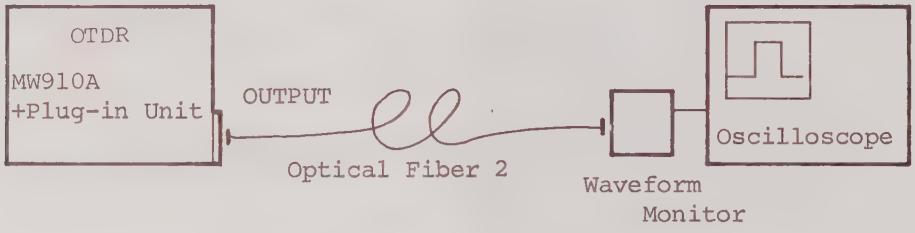


Fig. 4-9 Laser-output Pulse Width Adjustment Setup

Table 4-5 Laser-Output Pulse Width Specified Value and Adjustment Control

Set Pulse Width	Specified Pulse Width	Adjustment Variable Resistor
100 ns	100 ns	R12
*1 500 ns	500 ns	R13
1 µs	1 µs	R13
*1 2 µs	2 µs	R14
4 µs	4 µs	R14

*1: Setting for MH937A only

(2) Reference distance adjustment

Step	Procedure
1	Connect a length known optical fiber and set OUTPUT to ON.
2	Adjust variable resistor R11 so that the fiber length and its display up to the far-end Fresnel reflection are the same; for example, 10.585 km in Fig. 4-10.

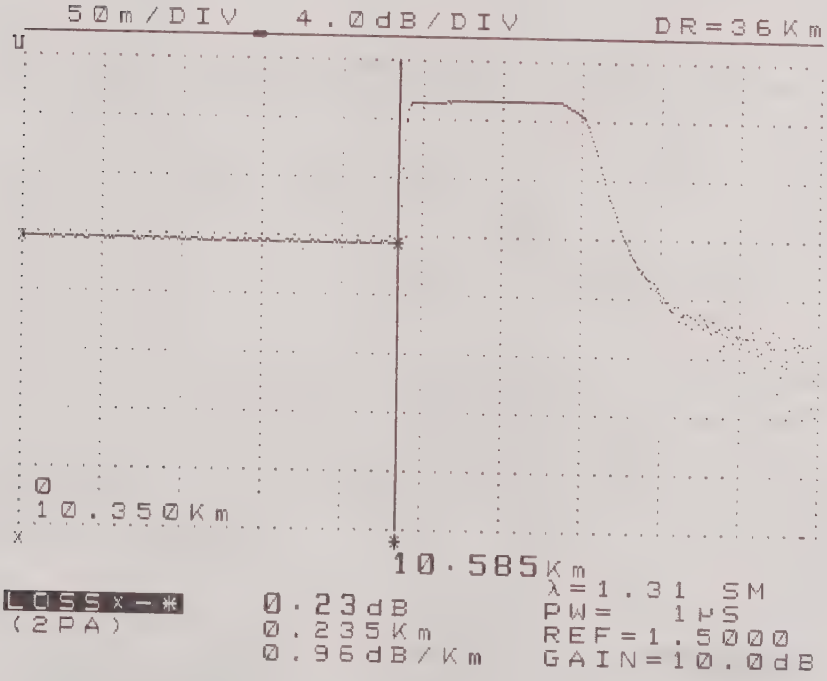


Fig. 4-10 Reference Distance Display

4.3.2 AO switch control timing adjustment

Step	Procedure
1	Connect the Optical Fiber 1 to the OUTPUT connector.
2	Set OUTPUT to ON and expand the near-end trace.
3	Adjust the mask distance corresponding to the set pulse width with each variable resistor to obtain the CRT display as shown in Fig. 4-11. The mask distance at each pulse width and adjustment variable resistors are listed in Table 4-6.

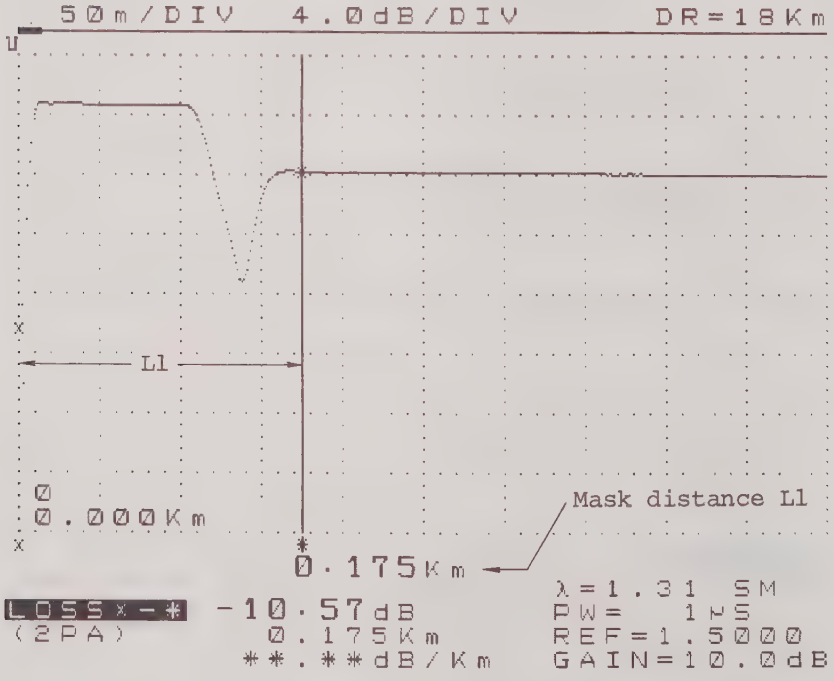


Fig. 4-11 Near-end Mask Distance L1

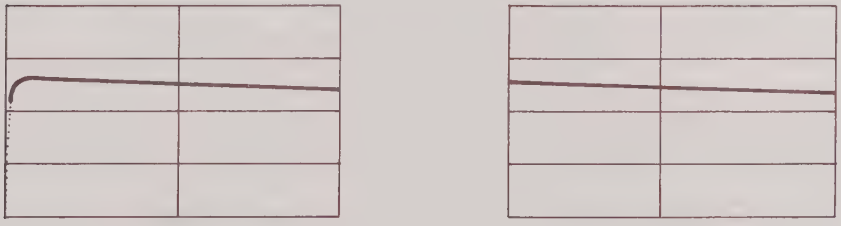
Table 4-6 Mask Distance L1 and Adjustment Variable Resistor Corresponding to Each Pulse Width

Set Pulse Width	Mask Distance L1	Adjustment Variable Resistor
100 ns	75 m	R15
*2 500 ns	120 m	R16
1 µs	175 m	R16
*2 2 µs	290 m	R17
4 µs	520 m	R17

*2: Setting for MH937A only

4 Set the horizontal scale to 25 m/div with the [H-SCALE] key.

5 Adjust variable resistor R18 so that the backscattering trace does not drop at the left end of the CRT display when the trace is shifted horizontally by pressing the [H-SHIFT] key and turning the rotary control (see Fig. 4-12).



(a) BAD trace (b) GOOD trace

Fig. 4-12 Backscattering Traces

(cont.)

Step	Procedure
6	Adjust each variable resistor and set the mask width corresponding to the set pulse width (shown in Fig. 4-13) to the value shown in Table 4-7.

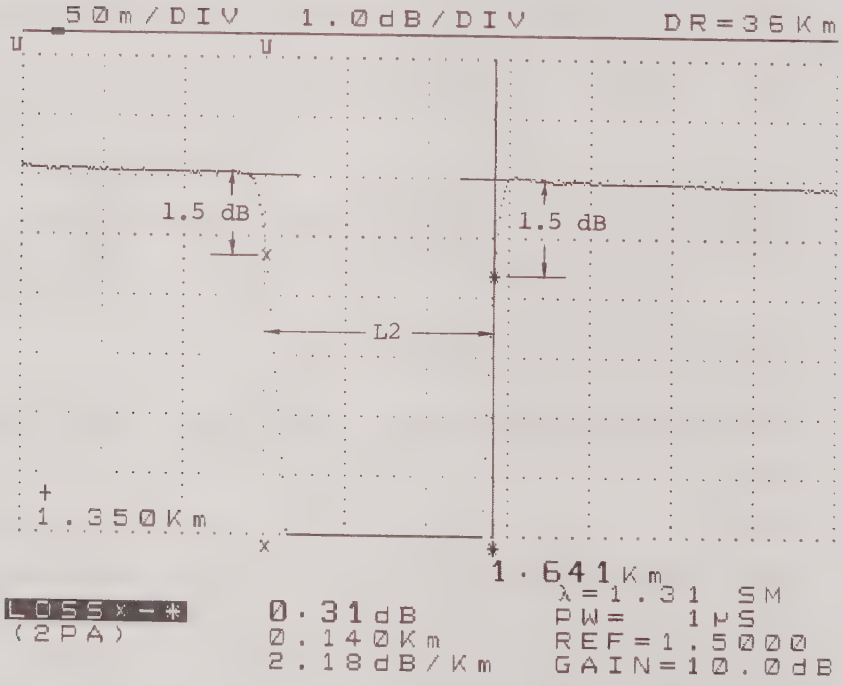


Fig. 4-13 Mask Width L2

Step	Procedure

Table 4-7 Mask Width and Adjustment Variable Resistor Corresponding to the Set Pulse Width

Set Pulse Width	Mask Width L2	Adjustment Variable Resistor
100 ns	40 m	R19
*3 500 ns	80 m	R20
1 µs	140 m	R20
*3 2 µs	250 m	R21
4 µs	470 m	R21

*3: Setting for MH937A only

7 Display three mask markers on the CRT as shown in Fig. 4-14.

8 Adjust the three masked positions with variable resistors R22, R104, and R106.

Using the vertical axis dotted lines on the CRT makes adjustments easy (as shown in Fig. 4-14).

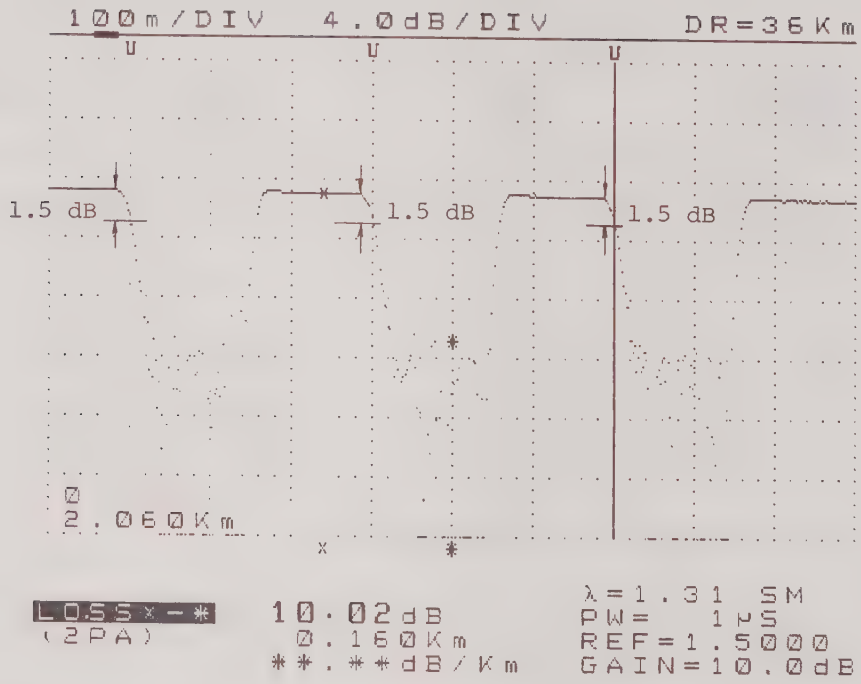


Fig. 4-14 Adjustment of Three Arbitrary Mask Positions

SECTION 5

REPLACEABLE PARTS

5.1 Introduction

This section contains information about ordering replacement parts or components. The following table shows circuit references (hereafter: CKT REF) and abbreviations used for items in the Parts Lists. The quantity of each item in the Parts List is "one" unless a quantitative description is given in the "NOTE" column.

(1) Circuit reference

AT:	Attenuator	K:	Relay	Q:	Transistor, diode, IC, rectifier	V:	Neon lamp, vacuum tube
C:	Capacitor	L:	Coil, microinductor	R:	Resistor	X:	Crystal OSC
F:	Fuse	M:	Meter, timer	S:	Switch	Z:	Unit
J:	Jack, plug, connector	P:	Lamp	T:	Transformer		

(2) Abbreviations

A:	amperes	Multi:	multiplying
Att, R var:	variable attenuator using film elements	N-ch:	N-channel
BL:	boundary layer	non-lin:	non-linear taper
Cer:	ceramic	Non-pol:	non polarity
CF:	carbon film	NPN:	negative-positive-negative
Comp:	composition	Ω:	ohms
CRT:	cathode-ray tube	p:	pico (x 10^{-12})
Di:	diode	Plast:	plastic film
DIP:	dual in-line package	PMTR:	potentiometer
Elect:	electrolytic aluminum	PNP:	positive-negative-positive
F:	farad	p-p:	peak-to-peak value
FET:	field-effect transistor	RFC:	RF choke
G:	ground	R-lamp:	resistor lamp
Ge:	germanium	rms:	effective value (root-mean-square)
H:	henry	SBD:	Schottky barrier diode
Hz:	hertz	SCR:	silicon-controlled rectifier
IC:	integrated circuit	Si:	silicon
IEC:	Conforms to IEC Safety Standards.	SRD:	step-recovery diode
J-FET:	junction FET	Tant:	tantalum
k:	kilo (x 10^{3})	TM:	time-lag
LED:	light-emitting diode	Tr:	transistor
M:	mega (x 10^{6})	Trans:	transformer
m:	milli (x 10^{-3})	μ:	micro (x 10^{-6})
MF:	metallized film	V:	volt
MOS-FET:	metal-oxide semiconductor FET	Var:	variable
M paper:	metallized paper	WW:	wire-wound
M plast:	metallized plastic film	XTAL:	crystal

5.2 Reading Capacitors/Resistors

5.2.1 Capacitor identification

Value in Picofarads (pF)

Number of zeros following value

EXAMPLES: 103 = 10,000 pF = 10^{-8} F or 0.01 µF

302 = 3,000 pF = $3x10^{-9}$ F or 0.003 µF

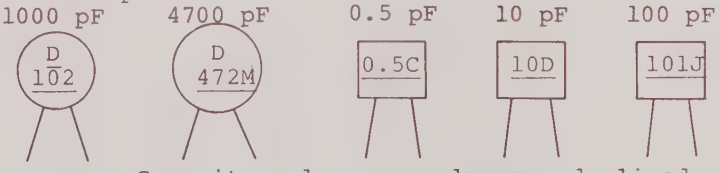
676 = 67,000,000 pF = $67x10^{-6}$ F or 67 µF

(a) Ceramic and polyester capacitors

Indication	0.5	1	10	101	102	103	104
Capacity	0.5 pF	1 pF	10 pF	100 pF	1000 pF	0.01 µF	0.1 µF

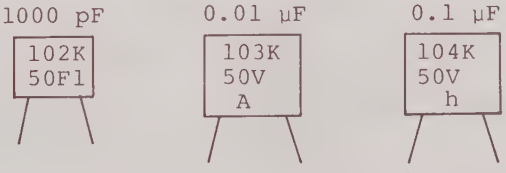
Example:

Ceramic Capacitor



Capacity values are always underlined.

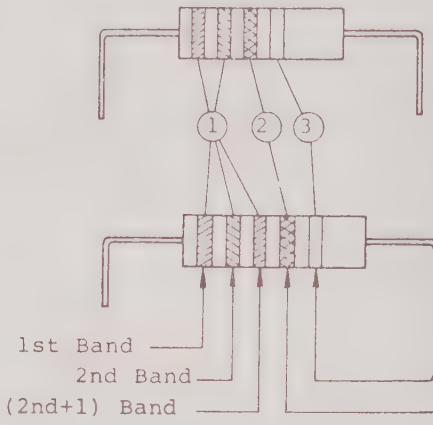
Polyester Capacitor



(b) Tantalum, metallized, and electrolytic capacitors

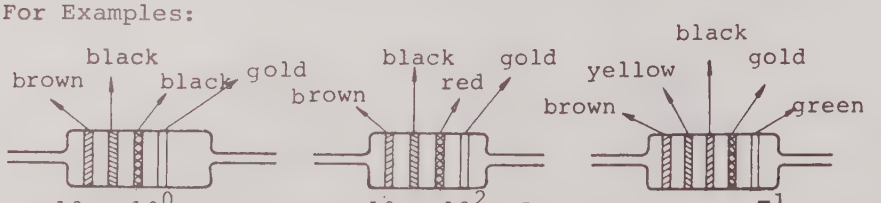
Indication	OR47	010	100	101
Capacity	0.47 µF	1 µF	10 µF	100 µF

5.2.2 Resistor identification



COLOR	① Figure		② Multiplier	③ Tolerance
	1st	2nd	3rd	4th
Black	0	0	$x10^0$	-
Brown	1	1	$x10^1$	-
Red	2	2	$x10^2$	-
Orange	3	3	$x10^3$	-
Yellow	4	4	$x10^4$	-
Green	5	5	$x10^5$	±0.5%
Blue	6	6	$x10^6$	-
Purple	7	7	$x10^7$	-
Grey	8	8	$x10^8$	-
White	9	9	$x10^9$	-
Gold	-	-	$x10^{-1}$	±5%
Silver	-	-	$x10^{-2}$	±10%
-----	-	-		±20%

For Examples:



5.3 Ordering

When ordering parts, please give the following descriptions by referring to the Parts List.

	Item	Example
(1)	Instrument name	PLUG-IN UNIT MH938A
(2)	Parts list name	Z8 LD DRIVER
(3)	CKT REF	C16
(4)	Parts name	SR16VB33(M) Note: Part name is given in parentheses ( ) in the Parts List. Parts with asterisks* require adjustment at the factory. When ordering with asterisks, give full, parts description.
(5)	Quantity	1
(6)	Instrument Serial No.	M31257

5.4 Parts List

Page

MH937A/938A/939A UNIT (W4W9545) 5-7

MH955A UNIT (W4W9582) 5-7

Z3 KEY-2 (W4W9547) 5-8

Z8 LD driver MH937A/938A/939A (W4W9548) 5-8

Z8 LD driver MH955A (W4W9578) 5-9

Z11 AMP MH937A (W4W9550) 5-10

Z11 AMP MH938A/939A/955A (W4W9580) 5-13

Z13 Optical Connector Sensor (W4W9552) 5-16

Z16 Unit Motherboard MH937A (W4W9553) 5-16

Z16 Unit Motherboard MH938A/MH938A (W4W9581) 5-18

Z16 Unit Motherboard MH955A (W4W9592) 5-20

Parts List : MH937A/MH938A/MH939A UNIT

CKT REF	DESCRIPTION	RATING	NOTE
G 1	Fan,(MD625B-12)		
J 1	Not assigned		
J 2	Not assigned		
J 3	Fiber plug,(FC)		
J 4	Fiber plug,(FC)		
J 5	Adapter,(SFCA)		
J 6	Adapter,(SFCA)		
J 7 to J30	Not assigned		
J31	Connector, (DF1-3S2.5R24)	3P	
J32 to J80	Not assigned		
J81	Connector, (27DP-LP-1.5)		
J82	Not assigned		
J83	Connector, (DF1-10S2.5R24)	10P	
J84	Not assigned		
J85	Not assigned		
J86	Not assigned		
J87	Not assigned		
J88	Not assigned		
J89	Not assigned		
J90	Not assigned		
J91	Connector, (DF1-8S2.5R24)	8P	
J92	Connector,(HRM-100-4)		
J93 to J110	Not assigned		
J111	Connector, (27DP-P-1.5)		
J112 to J130	Not assigned		
J131	Connector, (DF1-3S2.5R24)	3P	
J132 to J159	Not assigned		

( ): Manufacturer's part number
* : Selected at factory

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Parts List : MH937A/MH938A/MH939A UNIT

CKT REF	DESCRIPTION	RATING	NOTE
J160	Connector, (27DP-P-1.5)		
J161	Not assigned		
J162	Not assigned		
J163	Connector, (DF1-10S2.5R24)	10P	
J164	Connector, (DF1-8S2.5R24)	8P	
J165	Connector, (DF1-3S2.5R24)	3P	
J166	Connector, (DF1-8S2.5R24)	8P	
J167	Connector, (DF1-5S2.5R24)	5P	
J168	Connector, (DF1-8S2.5R24)	8P	
J169 to J230	Not assigned		
J231	Connector, (27DP-LP-1.5)		
J232	Not assigned		
J233	Connector, (HRM-100-1S1)		
J234	Not assigned		
J235	Not assigned		
J236	Fiber plug,(FC)		
J237	Not assigned		
J238	Not assigned		
J239	Not assigned		
J240	Not assigned		
J241	Fiber plug,(FC)		
Z 1	Not assigned		
Z 2	Not assigned		
Z 3	KEY-2 PC board, (W42U6693)		
Z 4	Not assigned		
Z 5	Not assigned		
Z 6	Not assigned		
Z 7	Not assigned		
Z 8	LD driver PC board, (W22U684)		
Z 9	AO driver PC board, (W42U6699)		
Z 10	Not assigned		

( ): Manufacturer's part number
* : Selected at factory

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Parts List : MH937A/MH938A/MH939A UNIT

CKT REF	DESCRIPTION	RATING	NOTE
Z11	AMP PC board,(W22U671)		
Z12	Not assigned		
Z13	Optical Connector Sensor PC board, (W42U6695)		
Z14	Not assigned		
Z15	Not assigned		
Z16	Unit Motherboard (W22U824)		
Z17	Not assigned		
Z18	Not assigned		
Z19	Not assigned		
Z20	Not assigned		
Z21	Not assigned		
Z22	LED Module		
Z23	LD + AO Module		
Z24	APD Module		

( ): Manufacturer's part number
* : Selected at factory

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Parts List : MH955A UNIT

CKT REF	DESCRIPTION	RATING	NOTE
G 1	Fan,(MD625B-12)		
J 1	Not assigned		
J 2	Not assigned		
J 3	Fiber plug,(FC)		
J 4	Fiber plug,(FC)		
J 5	Adapter,(SFCA)		
J 6	Adapter,(SFCA)		
J 7 to J30	Not assigned		
J31	Connector, (DF1-3S2.5R24)	3P	
J32 to J80	Not assigned		
J81	Connector, (27DP-LP-1.5)		
J82	Connector, (27DP-LP-1.5)		
J83	Connector, (DF1-10S2.5R24)	10P	
J84	Not assigned		
J85	Not assigned		
J86	Not assigned		
J87	Not assigned		
J88	Not assigned		
J89	Not assigned		
J90	Not assigned		
J91	Connector, (DF1-8S2.5R24)	8P	
J92	Connector, (HRM-100-4)		
J93 to J110	Not assigned		
J111	Connector, (27DP-P-1.5)		
J112 to J130	Not assigned		
J131	Connector, (DF1-3S2.5R24)		

( ): Manufacturer's part number
* : Selected at factory

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Parts List : MH955A UNIT

CKT REF	DESCRIPTION	RATING		NOTE
J132 to J159	Not assigned			
J160	Connector, (27DP-P-1.5)			
J161	Not assigned			
J162	Not assigned			
J163	Connector, (DF1-10S2.5R24)	10P		
J164	Connector, (DF1-8S2.5R24)	8P		
J165	Connector, (DF1-3S2.5R24)	3P		
J166	Connector, (DF1-8S2.5R24)	8P		
J167	Connector, (DF1-5S2.5R24)	5P		
J168	Connector, (DF1-8S2.5R24)	8P		
J169	Connector, (DF1-8S2.5R24)	8P		
J170 to J230	Not assigned			
J231	Connector, (27DP-LP-1.5)			
J232	Connector, (27DP-LP-1.5)			
J233	Connector, (HRM-100-1S1)			
J234	Not assigned			
J235	Not assigned			
J236	Fiber plug,(FC)			
J237	Not assigned			
J238	Not assigned			
J239	Not assigned			
J240	Not assigned			
J241	Fiber plug,(FC)			
Z 1	Not assigned			
Z 2	Not assigned			
Z 3	KEY-2 PC board, (W42U6693)			
Z 4	Not assigned			
Z 5	Not assigned			

( ): Manufacturer's part number
* : Selected at factory

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Parts List : MH955A UNIT

CKT REF	DESCRIPTION	RATING		NOTE
Z 6	Not assigned			
Z 7	Not assigned			
Z 8	LD driver PC board, (W22U684)			
Z 9	AO driver PC board, (W42U6699)			
Z10	Not assigned			
Z11	AMP PC board,(W22U671)			
Z12	Not assigned			
Z13	Optical Connector Sensor PC board, (W42U6695)			
Z14	Not assigned			
Z15	Not assigned			
Z16	Unit Motherboard (W22U824)			
Z17	Not assigned			
Z18	Not assigned			
Z19	Not assigned			
Z20	Not assigned			
Z21	Not assigned			
Z22	LED Module			
Z23	LD + AO Module			
Z24	APD Module			

( ): Manufacturer's part number
* : Selected at factory

W4W9582 3 3

Parts List : KEY-2 (Z3)

CKT REF	DESCRIPTION	RATING		NOTE
J 1	Plug,(DF1-3P-2.5DSA)	3P		
R 1	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 2	Var,MF,(RG161N15SB1kΩ)	1kΩ,1/2W		
S 1	Pushbutton, (HL20-LSOR)			built-in LED

( ): Manufacturer's part number
* : Selected at factory

W4W9547 1/1

Parts List : LD DRIVER (Z8) MH937A/MH938A/MH939A

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 2	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 3	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 4	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 5	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 6	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 7	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C 8	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C 9	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C10	Elect,(SR16VB-2200(M))	2200μF,±20%,16V		
C11	Elect,(SR16VB-2200(M))	2200μF,±20%,16V		
C12	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C13	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C14	Cer,(CC924CH1H101J)	100pF,±5%,50V		
C15	Cer,(CC924CH1H101J)	100pF,±5%,50V		
C16	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C17	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C18	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C19	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C20	Elect,(SR10VB-47(M))	47μF,±20%,10V		
C21	Elect,(SR10VB-47(M))	47μF,±20%,10V		
C22	Not assigned			
J 1	Connector, (27DP-R-PC-1)			
J 2	Not assigned			
J 3	Connector, (DF1-10P-2.5DSA)	10P		
L 1	Coil,(LH1-102K)	1mH		
L 2	Coil,(LH1-102K)	1mH		
L 3	Coil,(LH1-102K)	1mH		
L 4	Coil,(LH1-102K)	1mH		
M 1	Timer,(TM-O)			

( ): Manufacturer's part number
* : Selected at factory

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Parts List : LD DRIVER (Z8) MH937A/MH938A/MH939A

CKT REF	DESCRIPTION	RATING	NOTE
Q 1	Tr,(2SC1216)		
Q 2	Di,breakdown,(RD7.5E)	6.85 to 7.67V,400mW	
Q 3	Tr,(2SC1733)		
Q 4	Tr,(2SA603)		
Q 5	Di,(1S953)		
Q 6	Di,(1S953)		
Q 7	Di,(1S953)		
Q 8	Tr,(2SA711)		
Q 9	Tr,(2SA711)		
Q10	Tr,(2SA711)		
Q11	Tr,(2SC1253)		
Q12	Tr,(2SC1253)		
Q13	Di,(1SS99)		
Q14	Di,(1SS99)		
Q15	Tr,(2SC1251)		
Q16	Tr,(2SC1251)		
Q17	Tr,(2SC1251)		
Q18	Tr,(2SC1251)		
Q19	Not assigned		
R 1	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 2	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 3	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W	
R 4	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R 5	CF,(ARD25T201J)	200Ω,±5%,1/4W	
R 6	MF,(RN14K2E4990D)	499Ω,±0.5%,1/4W	
R 7	MF,(RN14K2E1101D)	1.1kΩ,±0.5%,1/4W	
R 8	MF,(RN14K2E1301D)	1.3kΩ,±0.5%,1/4W	
R 9	CF,(ARD25T391J)	390Ω,±5%,1/4W	
R10	CF,(ARD25T391J)	390Ω,±5%,1/4W	
R11	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R12	Var,MF,(POT1103H-1-502)	5kΩ,1/2W	
R13	MF,(RN14K2E2671D)	2.67kΩ,±0.5%,1/4W	
R14	MF,(RN14K2E2371D)	2.37kΩ,±0.5%,1/4W	
R15	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R16	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R17	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R18	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R19	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R20	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R21	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W	
R22	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W	
R23	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W	
R24	CF,(ARD25T470J)	47Ω,±5%,1/4W	
R25	CF,(ARD25T470J)	47Ω,±5%,1/4W	

( ): Manufacturer's part number

* : Selected at factory

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Parts List : LD DRIVER (Z8) MH937A/MH938A/MH939A

CKT REF	DESCRIPTION	RATING	NOTE
R26	CF,(ARD25T470J)	47Ω,±5%,1/4W	
R27	CF,(ARD25T470J)	47Ω,±5%,1/4W	
R28	CF,(ARD25T220J)	22Ω,±5%,1/4W	
R29	CF,(ARD25T220J)	22Ω,±5%,1/4W	
R30	CF,(ARD25T220J)	22Ω,±5%,1/4W	
R31	CF,(ARD25T220J)	22Ω,±5%,1/4W	
R32	CF,(ARD25T1R0J)	1.0Ω,±5%,1/4W	
R33	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R34	MF,(RN14K2E10R0D)	10.0Ω,±0.5%,1/4W	
R35	Not assigned		
R36	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W	
R37	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W	
R38	CF,(ARD25T105J)	1.0MΩ,±5%,1/4W	
S 1	Connector Switch (FFC-3AMEP)		

( ): Manufacturer's part number

* : Selected at factory

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Parts List : LD DRIVER (Z8) MH955A

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 2	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 3	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 4	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 5	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 6	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 7	Elect,(SR16VB-33(M))	33μF,±20%,16V	
C 8	Elect,(SR16VB-33(M))	33μF,±20%,16V	
C 9	Elect,(SR16VB-33(M))	33μF,±20%,16V	
C10	Elect,(SR16VB-2200(M))	2200μF,+20%,16V	
C11	Elect,(SR16VB-2200(M))	2200μF,±20%,16V	
C12	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C13	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C14	Cer,(CC924CH1H101J)	100pF,±5%,50V	
C15	Cer,(CC924CH1H101J)	100pF,±5%,50V	
C16	Elect,(SR16VB-33(M))	33μF,±20%,16V	
C17	Elect,(SR16VB-33(M))	33μF,±20%,16V	
C18	Elect,(SR16VB-33(M))	33μF,±20%,16V	
C19	Elect,(SR16VB-33(M))	33μF,±20%,16V	
C20	Elect,(SR10VB-47(M))	47μF,±20%,10V	
C21	Elect,(SR10VB-47(M))	47μF,±20%,10V	
C22	Elect,(SR16VB-33(M))	33μF,±20%,16V	
J 1	Connector, (27DP-R-PC-1)		
J 2	Connector, (27DP-R-PC-1)		
J 3	Connector, (DF1-10P2.5DSA)	10P	
K 1	Relay,(712-12)		
L 1	Coil,(LH1-102K)	1mH	
L 2	Coil,(LH1-102K)	1mH	
L 3	Coil,(LH1-102K)	1mH	
L 4	Coil,(LH1-102K)	1mH	
M 1	Timer,(TM-O)		

( ): Manufacturer's part number

* : Selected at factory

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Parts List : LD DRIVER (Z8) MH955A

CKT REF	DESCRIPTION	RATING	NOTE
Q 1	Tr,(2SC1216)		
Q 2	Di,breakdown,(RD7.5E)	6.85 to 7.67V,400mW	
Q 3	Tr,(2SC1733)		
Q 4	Tr,(2SA603)		
Q 5	Di,(1S953)		
Q 6	Di,(1S953)		
Q 7	Di,(1S953)		
Q 8	Tr,(2SA711)		
Q 9	Tr,(2SA711)		
Q10	Tr,(2SA711)		
Q11	Tr,(2SC1253)		
Q12	Tr,(2SC1253)		
Q13	Di,(1SS99)		
Q14	Di,(1SS99)		
Q15	Tr,(2SC1251)		
Q16	Tr,(2SC1251)		
Q17	Tr,(2SC1251)		
Q18	Tr,(2SC1251)		
Q19	Di,(1S953)		
R 1	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 2	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 3	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W	
R 4	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R 5	CF,(ARD25T201J)	200Ω,±5%,1/4W	
R 6	MF,(RN14K2E4990D)	499Ω,±0.5%,1/4W	
R 7	MF,(RN14K2E1101D)	1.10kΩ,±0.5%,1/4W	
R 8	MF,(RN14K2E1301D)	1.30kΩ,±0.5%,1/4W	
R 9	CF,(ARD25T391J)	390Ω,±5%,1/4W	
R10	CF,(ARD25T391J)	390Ω,±5%,1/4W	
R11	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R12	Var,MF,(RPT1103H-1-502)	5kΩ,1/2W	
R13	MF,(RN14K2E2671D)	2.67kΩ,±0.5%,1/4W	
R14	MF,(RN14K2E2371D)	2.37kΩ,±0.5%,1/4W	
R15	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R16	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R17	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R18	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R19	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R20	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R21	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W	
R22	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W	
R23	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W	
R24	CF,(ARD25T470J)	47Ω,±5%,1/4W	
R25	CF,(ARD25T470J)	47Ω,±5%,1/4W	

( ): Manufacturer's part number

* : Selected at factory

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Parts List : LD DRIVER (Z8) MH955A

CKT REF	DESCRIPTION	RATING		NOTE
R26	CF,(ARD25T470J)	47Ω,±5%,1/4W		
R27	CF,(ARD25T470J)	47Ω,±5%,1/4W		
R28	CF,(ARD25T220J)	22Ω,±5%,1/4W		
R29	CF,(ARD25T220J)	22Ω,±5%,1/4W		
R30	CF,(ARD25T220J)	22Ω,±5%,1/4W		
R31	CF,(ARD25T220J)	22Ω,±5%,1/4W		
R32	CF,(ARD25T1R0J)	1.0Ω,±5%,1/4W		
R33	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R34	MF,(RN14K2E10R0D)	10.0Ω,±0.5%,1/4W		
R35	CF,(ARD25T121J)	120Ω,±5%,1/4W		
R36	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R37	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W		
R38	CF,(ARD25T105J)	1.0MΩ,±5%,1/4W		
S 1	Connector Switch (FFC-3AMEP)			

( ): Manufacturer's part number
* : Selected at factory

Parts List : AMP (Z11) MH937A

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C 2	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C 3	Elect,(SRA50VB-22(M))	22μF,±20%,50V		
C 4	Cer,(CC924CK1H080D)	8pF,±0.5pF,50V		
C 5	Cer,(CC924CH1H100D)	10pF,±0.5pF,50V		
C 6	Cer,(CC924CH1H150J)	15pF,±5%,50V		
C 7	Cer,(CC924C1H103M)	0.01μF,±20%,50V		
C 8	Cer,(CC924C1H103M)	0.01μF,±20%,50V		
C 9	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C10	Cer,(CC45CK1H0R5CY)	0.5pF,±0.25pF,50V		
C11	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C12	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C13	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C14	Elect,(SR50VB-100(M))	100μF,±20%,50V		
C15	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C16	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C17	Cer,(CK924C1H102M)	1000pF,±20%,50V		
C18	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C19	Elect,(SR16VB-10(M))	10μF,±20%,16V		
C20	Not assigned			
C21	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C22	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C23	Elect,(SR16VB-10(M))	10μF,±20%,16V		
C24	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C25	Not assigned			
C26	Cer,(CC924CH1H100D)	10pF,±0.5pF,50V		
C27	Cer,(CC924CH1H050D)	5pF,±0.5pF,50V		
C28	Cer,(CC924CH1H100D)	10pF,±0.5pF,50V		
C29	Cer,(CC924CH1H470J)	47pF,±5%,50V		
C30	Cer,(CC924CH1H101J)	100pF,±5%,50V		
C31	Not assigned			
C32	Cer,(CC924CH1H100D)	10pF,±0.5pF,50V		
C33	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C34	Cer,(CK924C1H102M)	1000pF,±20%,50V		
C35	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C36	Cer,(CC924CH1H470J)	47pF,±5%,50V		
C37	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C38	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C39	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C40	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C41	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C42	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C43	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C44	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C45	Elect,(SR16VB-220(M))	220μF,±20%,16V		

( ): Manufacturer's part number
* : Selected at factory

Parts List : AMP (Z11) MH937A

CKT REF	DESCRIPTION	RATING		NOTE
C46	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C47	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C48	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C49	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C50	Not assigned			
C51	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C52	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C53	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C54	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C55	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C56	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C57	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C58	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C59	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C60	Cer,(CC924CH1H050D)	5pF,±0.5pF,50V		
C61	Not assigned			
C62	Not assigned			
C63	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C64	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C65	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C66	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C67	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C68	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C69	Elect,(SR16VB-100(M))	100μF,±20%,16V		
C70	Not assigned			
C71	Not assigned			
C72	Not assigned			
C73	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C74	Elect,(SR16VB-100(M))	100μF,±20%,16V		
C75	Elect,(SR16VB-100(M))	100μF,±20%,16V		
C76	Elect,(SR16VB-100(M))	100μF,±20%,16V		
C77	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C78	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C79	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C80	Not assigned			
C81	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C82	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C83	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C84	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C85	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C86	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C87	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C88	Cer,(CC924CH1H680J)	68pF,±5%,50V		
C89	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C90	Not assigned			

( ): Manufacturer's part number
* : Selected at factory

Parts List : AMP (Z11) MH937A

CKT REF	DESCRIPTION	RATING		NOTE
C 91	Elect,(SR16VB-100(M))	100μF,±20%,16V		
C 92	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 93	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 94	Elect,(SR16VB-47(M))	47μF,±20%,16V		
C 95	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 96	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 97	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 98	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C 99	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C100	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C101	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C102	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C103	Elect,(SR10VB-100(M))	100μF,±20%,10V		
C104	Cer,(CC924F1H104Z)	0.1μF,+80/-20%,50V		
C105	Elect,(SR16VB-100(M))	100μF,±20%,16V		
C106	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C107	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C108	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C109	Cer,(CC924CH1H100D)	10pF,±0.5pF,50V		
C110	Not assigned			
C111	Cer,(CC45CK1HCR5CY)	0.5pF,±0.25pF,50V		
C112	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C113	Cer,(CC924CH1H100D)	10pF,±0.5pF,50V		
C114	Cer,(CC45CK1H010CY)	1pF,±0.25pF,50V		
C115	Cer,(CC924F1H104Z)	0.1μF,+80/-20%,50V		
C116	Not assigned			
C117	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C118	Not assigned			
C119	Not assigned			
C120	Not assigned			
C121	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C122	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C123	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C124	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C125	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C126	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C127	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C128	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C129	Not assigned			
C130	Not assigned			
C131	Not assigned			
C132	Elect,(SR6.3VB-220(M))	220μF,±20%,6.3V		
C133	Elect,(SR6.3VB-220(M))	220μF,±20%,6.3V		
C134	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C135	Elect,(SR16VB-220(M))	220μF,±20%,16V		

( ): Manufacturer's part number
* : Selected at factory

Parts List : AMP (Z11) MH937A

CKT REF	DESCRIPTION	RATING	NOTE
C136	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V	
C137	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V	
C138	Elect,(SR16VB-220(M))	220μF,±20%,16V	
C139	Elect,(SR16VB-220(M))	220μF,±20%,16V	
C140	Not assigned		
C141	Elect,(SR16VB-220(M))	220μF,±20%,16V	
C142	Elect,(SR16VB-220(M))	220μF,±20%,16V	
C143	Elect,(SR16VB-220(M))	220μF,±20%,16V	
C144	Elect,(SR16VB-220(M))	220μF,±20%,16V	
C145	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V	
C146	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V	
C147	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V	
C148	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V	
C149	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V	
C150	Not assigned		
C151	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V	
C152	Not assigned		
C153	Not assigned		
C154	Not assigned		
C155	Cer,(CK924C1H103M)	0.01μF,±20%,50V	
C156	Cer,(CK924C1H103M)	0.01μF,±20%,50V	
C157	Cer,(CK924C1H103M)	0.01μF,±20%,50V	
C158	Cer,(CK924C1H103M)	0.01μF,±20%,50V	
C159	Cer,(CK924C1H103M)	0.01μF,±20%,50V	
C160	Cer,(CK924C1H103M)	0.01μF,±20%,50V	
C161	Cer,(CC924CH1H101J)	100pF,±5%,50V	
C162	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V	
C163	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V	
C164	Elect,(SR16VB-22(M))	22μF,±20%,16V	
C165	Elect,(SR16VB-22(M))	22μF,±20%,16V	
C166	Not assigned		
C167	Elect,(SR16VB-220(M))	220μF,±20%,16V	
C168	Elect,(SR16VB-220(M))	220μF,±20%,16V	
C169	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V	
C170	Not assigned		
C171	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C172	Elect,(SR16VB-220(M))	220μF,±20%,16V	
C173	Elect,(SR16VB-220(M))	220μF,±20%,16V	
C174	Elect,(SR16VB-220(M))	220μF,±20%,16V	
C175	Elect,(SR16VB-220(M))	220μF,±20%,16V	
J 1	Connector, (27DP-LR-PC)		
J 2	Plug, (HIF6B-40PA-1.27DSA)	40P	

( ): Manufacturer's part number
* : Selected at factory

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Parts List : AMP (Z11) MH937A

CKT REF	DESCRIPTION	RATING	NOTE
J 3	Connector, (27DP-R-PC-1)		
K 1	Reed relay,(NR-SD-12V)		
K 2	Reed relay,(NR-SD-12V)		
K 3	Reed relay,(NR-SD-12V)		
K 4	Reed relay,(NR-SD-12V)		
K 5	Reed relay,(NR-SD-12V)		
K 6	Reed relay,(NR-SD-12V)		
L 1	Coil,(SN-3-200)	10μH	
L 2	Coil,(SN-3-200)	10μH	
L 3	Coil,(SN-3-200)	10μH	
L 4	Not assigned		
L 5	Coil,(SN-8S-500)	72μH	
L 6	Coil,(SN-3-200)	10μH	
L 7	Coil,(SN-3-200)	10μH	
L 8	Coil,(SN-3-200)	10μH	
L 9	Coil,(SN-3-200)	10μH	
L10	Coil,(LF8-101K)	100μH	
L11	Coil,(SN-3-200)	10μH	
L12	Coil,(SN-3-200)	10μH	
L13	Coil,(SN-3-200)	10μH	
L14	Coil,(SN-3-200)	10μH	
L15	Coil,(LF8-101K)	100μH	
L16	Coil,(SN-8S-500)	72μH	
L17	Coil,(SN-8S-500)	72μH	
Q 1	IC,(LH0032CG)		
Q 2	Tr,(2SC505)		
Q 3	Di,(1S953)		
Q 4	Di,(1S953)		
Q 5	Di,breakdown,(RD20E)	18.02 to 20.72V, 400mW	
Q 6	Di,breakdown,(RD20E)	18.02 to 20.72V, 400mW	
Q 7	IC,(μPC251C)		
Q 8	IC,(μPC251C)		
Q 9	Di,(1S953)		
Q10	Di,(1S953)		
Q11	Di,breakdown,(1SZ52)	5.9 to 6.5V,250mW	

( ): Manufacturer's part number
* : Selected at factory

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Parts List : AMP (Z11) MH937A

CKT REF	DESCRIPTION	RATING	NOTE
Q12	Not assigned		
Q13	IC,(LH0032CG)		
Q14	IC,(LH0032CG)		
Q15	IC,(LH0032CG)		
Q16	IC,(LH0002CH)		
Q17	IC,(LF356N)		
Q18	IC,(LF356N)		
Q19	IC,(LF356N)		
Q20	Not assigned		
Q21	IC,(HI1-201HS-5)		
Q22	IC,(HI1-201HS-5)		
Q23	IC,(LF356N)		
Q24	IC,(LF356N)		
Q25	IC,(LF356N)		
Q26	Not assigned		
Q27	Not assigned		
Q28	IC,(74LS04)		
Q29	Not assigned		
Q30	IC,(74LS05)		
Q31	Di,(1S953)		
Q32	Di,(1S953)		
Q33	Di,(1S953)		
Q34	Di,(1S953)		
Q35	Di,(1S953)		
Q36	Di,(1S953)		
Q37	Tr,(2SC1733)		
Q38	Tr,(2SC1216)		
Q39	Not assigned		
Q40	Tr,(2SC1733)		
Q41	Tr,(2SC1216)		
Q42	Di,breakdown,(RD5.1E)	4.8 to 5.37V,400mW	
Q43	Tr,(2SA711K)		
Q44	Tr,(2SA711K)		
Q45	Tr,(2SA578L)		
Q46	Di,breakdown,(RD7.5E)	6.85 to 7.67V,400mW	
Q47	Di,breakdown,(RD6.2E)	5.78 to 6.44V,400mW	
Q48	Di,breakdown,(RD6.2E)	5.78 to 6.44V,400mW	
Q49	Not assigned		
Q50	Di,breakdown,(02BZ2.2)	1.88 to 2.56V,250mW	
Q51	Tr,(2SC1733)		
Q52	Di,(1S953)		
Q53	Tr,(2SC1010)		
Q54	Tr,(2SC1216)		
Q55	Tr,(2SD78)		
Q56	Tr,(2SC1253)		

( ): Manufacturer's part number
* : Selected at factory

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Parts List : AMP (Z11) MH937A

CKT REF	DESCRIPTION	RATING	NOTE
Q57	Tr,(2SC1253)		
Q58	Not assigned		
Q59	Not assigned		
Q60	Tr,(2SC2901)		
Q61	Tr,(2SC2901)		
Q62	Tr,(2SC1216)		
Q63	Tr,(2SC1216)		
Q64	IC,(μPC624D)		
Q65	IC,(μPC154A)		
Q66	Di,(1S953)		
Q67	IC,(LM317M)		
Q68	Di,(1S953)		
Q69	Not assigned		
Q70	Di,breakdown,(RD5.1E)	4.8 to 5.37V,400mW	
Q71	IC,(μPC209C)		
Q72	Not assigned		
Q73	Not assigned		
Q74	Not assigned		
Q75	Di,(1S2210)		
Q76	Di,(1S2210)		
Q77	Di,(1S2210)		
Q78	Di,(1S2210)		
Q79	Di,(1S2210)		
R 1	MF,(RN14K2E4991D)	4.99kΩ,±0.5%,1/4W	
R 2	MF,(RN14K2E61R9D)	61.9Ω,±0.5%,1/4W	
R 3	Var,MF, (POT1103H-1-104)	100kΩ,1/4W	
R 4	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W	
R 5	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W	
R 6	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W	
R 7	CF,(ARD25T104J)	100kΩ,±5%,1/4W	
R 8	CF,(ARD25T473J)	47kΩ,±5%,1/4W	
R 9	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R10	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R11	Not assigned		
R12	CF,(ARD25T121J)	120Ω,±5%,1/4W	
R13	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W	
R14	CF,(ARD25T224J)	220kΩ,±5%,1/4W	
R15	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W	
R16	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W	
R17	MF,(RN14K2E3922D)	39.2kΩ,±0.5%,1/4W	
R18	MF,(RN14K2E4992D)	49.9kΩ,±0.5%,1/4W	
R19	CF,(ARD25T154J)	150kΩ,±5%,1/4W	

( ): Manufacturer's part number
* : Selected at factory

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Parts List : AMP (Z11) MH937A

CKT REF	DESCRIPTION	RATING	NOTE
R20	Not assigned		
R21	MF,(RN14K2E1002D)	10.0kΩ,±0.5%,1/4W	
R22	MF,(RN14K2E1002D)	10.0kΩ,±0.5%,1/4W	
R23	MF,(RN14K2E2003D)	200kΩ,±0.5%,1/4W	
R24	MF,(RN14K2E2003D)	200kΩ,±0.5%,1/4W	
R25	MF,(RN14K2E3322D)	33.2kΩ,±0.5%,1/4W	
R26	MF,(RN14K2E7500D)	750Ω,±0.5%,1/4W	
R27	Var,MF, (POT1103H-1-503)	50kΩ,1/4W	
R28	CF,(ARD25T154J)	150kΩ,±5%,1/4W	
R29	Var,MF, (POT1103H-1-504)	500kΩ,1/4W	
R30	Var,MF, (POT1103H-1-203)	20kΩ,1/4W	
R31	Not assigned		
R32	Not assigned		
R33	Not assigned		
R34	Not assigned		
R35	MF,(RN14K2E1691D)	1.69kΩ,±0.5%,1/4W	
R36	MF,(RN14K2E7501D)	7.50k ,±0.5%,1/4W	
R37	MF,(RN14K2E61R9D)	61.9 ,±0.5%,1/4W	
R38	Var,MF, (POT1103H-1-104)	100kΩ,1/4W	
R39	MF,(RN14K2E1961D)	1.96kΩ,±0.5%,1/4W	
R40	MF,(RN14K2E1002D)	10.0kΩ,±0.5%,1/4W	
R41	Not assigned		
R42	MF,(RN14K2E61R9D)	61.9Ω,±0.5%,1/4W	
R43	Not assigned		
R44	Not assigned		
R45	Not assigned		
R46	Var,MF, (POT1103H-1-104)	100kΩ,1/4W	
R47	Not assigned		
R48	MF,(RN14K2E4991D)	4.99kΩ,±0.5%,1/4W	
R49	MF,(RN14K2E4991D)	4.99k ,±0.5%,1/4W	
R50	MF,(RN14K2E61R9D)	61.9Ω,±0.5%,1/4W	
R51	Not assigned		
R52	Var,MF, (POT1103H-1-104)	100kΩ,1/4W	
R53	MF,(RN14K2E1002D)	10.0kΩ,±0.5%,1/4W	
R54	MF,(RN14K2E1430D)	143Ω,±0.5%,1/4W	
R55	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R56	Var,MF, (POT1103H-1-503)	50kΩ,1/4W	

( ): Manufacturer's part number
* : Selected at factory

Parts List : AMP (Z11) MH937A

CKT REF	DESCRIPTION	RATING	NOTE
R57	Var,MF, (POT1103H-1-503)	50kΩ,1/4W	
R58	CF,(ARD25T334J)	330kΩ,±5%,1/4W	
R59	Var,MF, (POT1103H-1-503)	50kΩ,1/4W	
R60	MF,(RN14K2E1002D)	10.0kΩ,±0.5%,1/4W	
R61	Not assigned		
R62	Var,MF, (POT1103H-1-502)	5kΩ,1/4W	
R63	MF,(RN14K2E1782D)	17.8kΩ,±0.5%,1/4W	
R64	Not assigned		
R65	Not assigned		
R66	Not assigned		
R67	Not assinged		
R68	MF,(RN14K2E2150D)	215Ω,±0.5%,1/4W	
R69	MF,(RN14K2E2870D)	287Ω,±0.5%,1/4W	
R70	MF,(RN14K2E2870D)	287Ω,±0.5%,1/4W	
R71	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R72	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R73	MF,(RN14K2E7500D)	750Ω,±0.5%,1/4W	
R74	MF,(RN14K2E1820D)	182Ω,±0.5%,1/4W	
R75	MF,(RN14K2E1820D)	182Ω,±0.5%,1/4W	
R76	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R77	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R78	MF,(RN14K2E7500D)	750Ω,±0.5%,1/4W	
R79	MF,(RN14K2E1820D)	182Ω,±0.5%,1/4W	
R80	MF,(RN14K2E1820D)	182Ω,±0.5%,1/4W	
R81	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R82	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R83	MF,(RN14K2E7500D)	750Ω,±0.5%,1/4W	
R84	MF,(RN14K2E1820D)	182Ω,±0.5%,1/4W	
R85	MF,(RN14K2E1820D)	182Ω,±0.5%,1/4W	
R86	MF,(RN14K2E1500D)	150Ω,±0.5%,1/4W	
R87	MF,(RN14K2E1500D)	150Ω,±0.5%,1/4W	
R88	Not assigned		
R89	MF,(RN14K2E43R2D)	43.2Ω,±0.5%,1/4W	
R90	MF,(RN14K2E43R2D)	43.2Ω,±0.5%,1/4W	
R91	Not assigned		
R92	MF,(RN14K2E1820D)	182Ω,±0.5%,1/4W	
R93	MF,(RN14K2E51R1D)	51.1Ω,±0.5%,1/4W	
R94	MF,(RN14K2E51R1D)	51.1Ω,±0.5%,1/4W	
R95	Var,MF, (POT1103H-1-101)	100Ω,1/2W	
R96	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	

( ): Manufacturer's part number
* : Selected at factory

Parts List : AMP (Z11) MH937A

CKT REF	DESCRIPTION	RATING	NOTE
R 97	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R 98	MF,(RN14K2E3650D)	365Ω,±0.5%,1/4W	
R 99	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R100	Not assigned		
R101	Not assigned		
R102	Not assigned		
R103	MF,(RN14K2E5900D)	590Ω,±0.5%,1/4W	
R104	MF,(RN14K2E51R1D)	51.1Ω,±0.5%,1/4W	
R105	MF,(RN14K2E51R1D)	51.1Ω,±0.5%,1/4W	
R106	Var,MF, (POT1103H-1-101)	100kΩ,1/4W	
R107	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R108	MF,(RN14K2E2151D)	2.15kΩ,±0.5%,1/4W	
R109	MF,(RN14K2E1781D)	1.78kΩ,±0.5%,1/4W	
R110	Not assigned		
R111	MF,(RN14K2E1501D)	1.50kΩ,±0.5%,1/4W	
R112	Not assigned		
R113	MF,(RN14K2E16R9D)	16.9Ω,±0.5%,1/4W	
R114	MF,(RN14K2E16R9D)	16.9Ω,±0.5%,1/4W	
R115	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R116	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R117	MF,(RN14K2E1330D)	133Ω,±0.5%,1/4W	
R118	MF,(RN14K2E1330D)	133Ω,±0.5%,1/4W	
R119	Var,MF, (POT1103H-1-101)	100kΩ,1/4W	
R120	Not assigned		
R121	MF,(RN14K2E7500D)	750Ω,±0.5%,1/4W	
R122	MF,(RN14K2E7500D)	750Ω,±0.5%,1/4W	
R123	MF,(RN14K2E8061D)	8.06kΩ,±0.5%,1/4W	
R124	MF,(RN14K2E8061D)	8.06kΩ,±0.5%,1/4W	
R125	MF,(RN14K2E2001D)	2.00kΩ,±0.5%,1/4W	
R126	MF,(RN14K2E6340D)	634Ω,±0.5%,1/4W	
R127	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R128	MF,(RN14K2E1430D)	143Ω,±0.5%,1/4W	
R129	MF,(RN14K2E1430D)	143Ω,±0.5%,1/4W	
R130	Not assigned		
R131	MF,(RN14K2E5110D)	511Ω,±0.5%,1/4W	
R132	MF,(RN14K2E5110D)	511Ω,±0.5%,1/4W	
R133	MF,(RN14K2E3741D)	3.74kΩ,±0.5%,1/4W	
R134	MF,(RN14K2E6190D)	619Ω,±0.5%,1/4W	
R135	MF,(RN14K2E4021D)	4.02kΩ,±0.5%,1/4W	
R136	MF,(RN14K2E2150D)	215Ω,±0.5%,1/4W	
R137	MF,(RN14K2E2871D)	2.87kΩ,±0.5%,1/4W	
R138	MF,(RN14K2E2001D)	2.00kΩ,±0.5%,1/4W	

( ): Manufacturer's part number
* : Selected at factory

Parts List : AMP (Z11) MH937A

CKT REF	DESCRIPTION	RATING	NOTE
R139	Var,MF, (POT1103H-1-101)	100Ω,1/4W	
R140	Not assigned		
R141	Not assigned		
R142	MF,(RN14K2E43R2D)	43.2Ω,±0.5%,1/4W	
R143	MF,(RN14K2E43R2D)	43.2Ω,±0.5%,1/4W	
R144	MF,(RN14K2E1501D)	1.50kΩ,±0.5%,1/4W	
R145	MF,(RN14K2E1501D)	1.50kΩ,±0.5%,1/4W	
R146	MF,(RN14K2D1911D)	1.91kΩ,±0.5%,1/4W	
R147	MF,(RN14K2E1911D)	1.91kΩ,±0.5%,1/4W	
R148	MF,(RN14K2E1400D)	140Ω,±0.5%,1/4W	
R149	MF,(RN14K2E1400D)	140Ω,±0.5%,1/4W	
R150	MF,(RN14K2E1400D)	140Ω,±0.5%,1/4W	
R151	MF,(RN14K2E1400D)	140Ω,±0.5%,1/4W	
R152	CF,(ARD25T271J)	270 ,±5%,1/4W	
R153	MF,(RN14K2E2670D)	267Ω,±0.5%,1/4W	
R154	MF,(RN14K2E10R0D)	10.0Ω,±0.5%,1/4W	
R155	MF,(RN14K2E1580D)	158Ω,±0.5%,1/4W	
R156	MF,(RN14K2E6812D)	68.1kΩ,±0.5%,1/4W	
R157	MF,(RN14K2E6812D)	68.1kΩ,±0.5%,1/4W	
R158	Not assigned		
R159	Not assigned		
R160	Not assigned		
R161	Not assigned		
R162	MF,(RN14K2E2370D)	237Ω,±0.5%,1/4W	
R163	Not assigned		
R164	Not assigned		
R165	Var,MF, (POT1103H-1-501)	500Ω,1/4W	
R166	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R167	MF,(RN14K2E43R2D)	43.2Ω,±0.5%,1/4W	
R168	MF,(RN14K2E1211D)	1.21kΩ,±0.5%,1/4W	
R169	MF,(RN14K2E2211D)	2.21kΩ,±0.5%,1/4W	
R170	MF,(RN14K2E2670D)	267Ω,±0.5%,1/4W	
R171	Not assigned		
R172	Not assigned		
R173	MF,(RN14K2E1692D)	16.9kΩ,±0.5%,1/4W	
R174	MF,(RN14K2E4221D)	4.22kΩ,±0.5%,1/4W	
R175	MF,(RN14K2E2672D)	26.7kΩ,±0.5%,1/4W	
R176	MF,(RN14K2E2151D)	2.15kΩ,±0.5%,1/4W	
R177	MF,(RN14K2E1302D)	13.0kΩ,±0.5%,1/4W	
R178	MF,(RN14K2E6041D)	6.04kΩ,±0.5%,1/4W	
R179	MF,(RN14K2E4750D)	475Ω,±0.5%,1/4W	
R180	Var,MF, (POT1103H-1-203)	20kΩ,1/4W	

( ): Manufacturer's part number
* : Selected at factory

Parts List : AMP (Z11) MH937A

CKT REF	DESCRIPTION	RATING		NOTE
R181	Not assigned			
R182	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W		
R183	MF,(RN14K2E3241D)	3.24kΩ,±0.5%,1/4W		
R184	MF,(RN14K2E1821D)	1.82kΩ,±0.5%,1/4W		
R185	MF,(RN14K2E5491D)	5.49kΩ,±0.5%,1/4W		
R186	Var,MF, (POT1103H-1-501)	500Ω,1/4W		
R187	Var,MF, (POT11 3H-1-102)	1kΩ,1/4W		
R188	MF,(RN14K2E43R2D)	43.2Ω,±0.5%,1/4W		
R189	MF,(RN14K2E2001D)	2.00kΩ,±0.5%,1/4W		
R190	MF,(RN14K2E2001D)	2.00kΩ,±0.5%,1/4W		
R191	MF,(RN14K2E43R2D)	43.2Ω,±0.5%,1/4W		
R192	MF,(RN14K2E4641D)	4.64kΩ,±0.5%,1/4W		
R193	Not assigned			
R194	Not assigned			
R195	Not assigned			
R196	Not assigned			
R197	Not assigned			
R198	Not assigned			
R199	MF,(RN14K2E1002D)	10.0kΩ,±0.5%,1/4W		
R200	Var,MF, (POT1103H-1-503)	50kΩ,1/4W		
R201	Var,MF, (POT1103H-1-503)	50kΩ,1/4W		
R202	Var,MF, (POT1103H-1-503)	50kΩ,1/4W		
R203	MF,(RN14K2E1002D)	10.0kΩ,±0.5%,1/4W		
R204	CF,(ARD25T105J)	1.0MΩ,±5%,1/4W		
R205	MF,(RNI4K2E1961D)	1.96kΩ,±0.5%,1/4W		
R206	Not assigned			
R207	Not assigned			
R208	Not assigned			
R209	Not assigned			
R210	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R211	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R212	CF,(ARD25T681J)	680Ω,±5%,1/4W		
S 1	Connector Switch (FFC-3AMEP)			
S 2	Connector Switch (FFC-3AMEP)			
S 3	No assigned			
S 4	Connector Switch (FFC-2AMEP)			
S 5	Connector Switch (FFC-3AMEP)			

( ): Manufacturer's part number
* : Selected at factory

Parts List : AMP (Z11) MH938A/MH939A/MH955A

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C 2	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C 3	Elect,(SRA50VB-22(M))	22μF,±20%,50V		
C 4	Cer,(CC924CH1H040C)	4pF,±0.25pF,50V		
C 5	Cer,(CC924CH1H100D)	10pF,±0.5pF,50V		
C 6	Cer,(CC924CH1H150J)	15pF,±5%,50V		
C 7	Cer,(CC924C1H103M)	0.01μF,±20%,50V		
C 8	Cer,(CC924C1H103M)	0.01μF,±20%,50V		
C 9	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C10	Cer,(CC45CK1H0R5CY)	0.5pF,±0.25pF,50V		
C11	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C12	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C13	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C14	Elect,(SR50VB-100(M))	100μF,±20%,50V		
C15	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C16	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C17	Cer,(CK924C1H102M)	1000pF,±20%,50V		
C18	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C19	Elect,(SR16VB-10(M))	10μF,±20%,16V		
C20	Not assigned			
C21	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C22	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C23	Elect,(SR16VB-10(M))	10μF,±20%,16V		
C24	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C25	Not assigned			
C26	Cer,(CC924CH1H100D)	10pF,±0.5pF,50V		
C27	Cer,(CC924CH1H050D)	5pF,±0.5pF,50V		
C28	Cer,(CC924CH1H100D)	10pF,±0.5pF,50V		
C29	Cer,(CC924CH1H470J)	47pF,±5%,50V		
C30	Cer,(CC924CH1H101J)	100pF,±5%,50V		
C31	Not assigned			
C32	Cer,(CC924CH1H100D)	10pF,±5%,50V		
C33	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C34	Cer,(CK924C1H102M)	1000pF,±20%,50V		
C35	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C36	Cer,(CC924CH1H470J)	47pF,±5%,50V		
C37	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C38	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C39	Cer,(CK924C1H103M)	0.01 F,+20%,50V		
C40	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C41	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C42	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C43	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C44	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C45	Elect,(SR16VB-220(M))	220μF,±20%,16V		

( ): Manufacturer's part number
* : Selected at factory

Parts List : AMP (Z11) MH938A/MH939A/MH955A

CKT REF	DESCRIPTION	RATING		NOTE
C46	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C47	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C48	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C49	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C50	Not assigned			
C51	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C52	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C53	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C54	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C55	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C56	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C57	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C58	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C59	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C60	Cer,(CC924CH1H050D)	5pF,±0.5pF,50V		
C61	Not assigned			
C62	Not assigned			
C63	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C64	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C65	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C66	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C67	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C68	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C69	Elect,(SR16VB-100(M))	100μF,±20%,16V		
C70	Not assigned			
C71	Not assigned			
C72	Not assigned			
C73	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C74	Elect,(SR16VB-100(M))	100μF,±20%,16V		
C75	Elect,(SR16VB-100(M))	100μF,±20%,16V		
C76	Elect,(SR16VB-100(M))	100μF,±20%,16V		
C77	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C78	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C79	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C80	Not assigned			
C81	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C82	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C83	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C84	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C85	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C86	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C87	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C88	Cer,(CC924CH1H680J)	68pF,±5%,50V		
C89	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C90	Not assigned			

( ): Manufacturer's part number
* : Selected at factory

Parts List : AMP (Z11) MH938A/MH939A/MH955A

CKT REF	DESCRIPTION	RATING		NOTE
C91	Elect,(SR16VB-100(M))	100μF,±20%,16V		
C92	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C93	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C94	Elect,(SR16VB-47(M))	47μF,±20%,16V		
C95	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C96	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C97	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C98	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C99	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C100	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C101	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C102	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C103	Elect,(SR10VB-100(M))	100μF,±20%,10V		
C104	Cer,(CC924F1H104Z)	0.1μF,+80/-20%,50V		
C105	Elect,(SR16VB-100(M))	100μF,±20%,16V		
C106	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C107	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C108	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C109	Cer,(CC924CH1H100D)	10pF,±0.5pF,50V		
C110	Not assigned			
C111	Cer,(CC45CK1H0R5CY)	0.5pF,±0.25pF,50V		
C112	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C113	Cer,(CC924CH1H100D)	10pF,±0.5pF,50V		
C114	Cer,(CC45CK1H010CY)	1pF,±0.25pF,50V		
C115	Cer,(CC924F1H104Z)	0.1μF,+80/-20%,50V		
C116	Not assigned			
C117	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C118	Not assigned			
C119	Not assigned			
C120	Not assigned			
C121	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C122	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C123	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C124	Elect,(SR16VB-33(M))	33μF,±20%,16V		
C125	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C126	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C127	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C128	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C129	Not assigned			
C130	Not assigned			
C131	Not assigned			
C132	Elect,(SR6.3VB-220(M))	220μF,±20%,6.3V		
C133	Elect,(SR6.3VB-220(M))	220μF,±20%,6.3V		
C134	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C135	Elect,(SR16VB-220(M))	220μF,±20%,16V		

( ): Manufacturer's part number
* : Selected at factory

Parts List : AMP (Z11) MH938A/MH939A/MH955A

CKT REF	DESCRIPTION	RATING		NOTE
C136	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C137	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C138	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C139	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C140	Not assigned			
C141	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C142	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C143	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C144	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C145	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C146	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C147	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C148	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C149	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C150	Not assigned			
C151	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C152	Not assigned			
C153	Not assigned			
C154	Not assigned			
C155	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C156	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C157	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C158	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C159	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C160	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C161	Cer,(CC924CH1H101J)	100pF,±5%,50V		
C162	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C163	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C164	Elect,(SR16VB-22(M))	22μF,±20%,16V		
C165	Elect,(SR16VB-22(M))	22μF,±20%,16V		
C166	Not assigned			
C167	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C168	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C169	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C170	Not assigned			
C171	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C172	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C173	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C174	Elect,(SR16VB-220(M))	220μF,±20%,16V		
C175	Elect,(SR16VB-220(M))	220μF,±20%,16V		
J 1	Connector (27DP-LR-PC)			
J 2	Plug, (HIF6B-40PA-1.27DSA)	40P		
J 3	Connector, (27DP-R-PC-1)			

( ): Manufacturer's part number
* : Selected at factory

Parts List : AMP (Z11) MH938A/MH939A/MH955A

CKT REF	DESCRIPTION	RATING		NOTE
K 1	Reed relay,(NR-SD-12V)			
K 2	Reed relay,(NR-SD-12V)			
K 3	Reed relay,(NR-SD-12V)			
K 4	Reed relay,(NR-SD-12V)			
K 5	Reed relay,(NR-SD-12V)			
K 6	Reed relay,(NR-SD-12V)			
L 1	Coil,(SN-3-200)	10μH		
L 2	Coil,(SN-3-200)	10μH		
L 3	Coil,(SN-3-200)	10μH		
L 4	Not assigned			
L 5	Coil,(SN-8S-500)	72μH		
L 6	Coil,(SN-3-200)	10μH		
L 7	Coil,(SN-3-200)	10μH		
L 8	Coil,(SN-3-200)	10μH		
L 9	Coil,(SN-3-200)	10μH		
L10	Coil,(LF8-101K)	100μH		
L11	Coil,(SN-3-200)	10μH		
L12	Coil,(SN-3-200)	10μH		
L13	Coil,(SN-3-200)	10μH		
L14	Coil,(SN-3-200)	10μH		
L15	Coil,(LF8-101K)	100μH		
L16	Coil,(SN-8S-500)	72μH		
L17	Coil,(SN-8S-500)	72μH		
Q 1	IC,(LH0032CG)			
Q 2	Tr,(2SC505)			
Q 3	Di,(1S953)			
Q 4	Di,(1S953)			
Q 5	Di,breakdown,(RD20E)	18.02 to 20.72V, 400mW		
Q 6	Di,breakdown,(RD20E)	18.02 to 20.72V, 400mW		
Q 7	IC,(μPC251C)			
Q 8	IC,(μPC251C)			
Q 9	Di,(1S953)			
Q10	Di,(1S953)			
Q11	Di,breakdown,(1S252)	5.9 to 6.5V,250mW		
Q12	Not assigned			
Q13	IC,(LH0032CG)			
Q14	IC,(LH0032CG)			
Q15	IC,(LH0032CG)			

( ): Manufacturer's part number
* : Selected at factory

Parts List : AMP (Z11) MH938A/MH939A/MH955A

CKT REF	DESCRIPTION	RATING		NOTE
Q16	IC,(LH0002CH)			
Q17	IC,(LF356N)			
Q18	IC,(LF356N)			
Q19	IC,(LF356N)			
Q20	Not assigned			
Q21	IC,(HI1-201HS-5)			
Q22	IC,(HI1-201HS-5)			
Q23	IC,(LF356N)			
Q24	IC,(LF356N)			
Q25	IC,(LF356N)			
Q26	Not assigned			
Q27	Not assigned			
Q28	IC,(74LS04)			
Q29	Not assigned			
Q30	IC,(74LS05)			
Q31	Di,(1S953)			
Q32	Di,(1S953)			
Q33	Di,(1S953)			
Q34	Di,(1S953)			
Q35	Di,(1S953)			
Q36	Di,(1S953)			
Q37	Tr,(2SC1733)			
Q38	Tr,(2SC1216)			
Q39	Not assigned			
Q40	Tr,(2SC1733)			
Q41	Tr,(2SC1216)			
Q42	Di,breakdown,(RD5.1E)	4.8 to 5.37V,400mW		
Q43	Tr,(2SA711K)			
Q44	Tr,(2SA711K)			
Q45	Tr,(2SA578L)			
Q46	Di,breakdown,(RD7.5E)	6.85 to 7.67V,400mW		
Q47	Di,breakdown,(RD6.2E)	5.78 to 6.44V,400mW		
Q48	Di,breakdown,(RD6.2E)	5.78 to 6.44V,400mW		
Q49	Not assigned			
Q50	Di,breakdown,(02BZ2.2)	1.88 to 2.56V,250mW		
Q51	Tr,(2SC1733)			
Q52	Di,(1S953)			
Q53	Tr,(2SC1010)			
Q54	Tr,(2SC1216)			
Q55	Tr,(2SD78)			
Q56	Tr,(2SC1253)			
Q57	Tr,(2SC1253)			
Q58	Not assigned			
Q59	Not assigned			
Q60	Tr,(2SC2901)			

( ): Manufacturer's part number
* : Selected at factory

Parts List : AMP (Z11) MH938A/MH939A/MH955A

CKT REF	DESCRIPTION	RATING		NOTE
Q61	Tr,(2SC2901)			
Q62	Tr,(2SC1216)			
Q63	Tr,(2SC1216)			
Q64	IC,(μPC624D)			
Q65	IC,(μPC154A)			
Q66	Di,(1S953)			
Q67	IC,(LM317M)			
Q68	Di,(1S953)			
Q69	Not assigned			
Q70	Di,breakdown,(RD5.1E)	4.8 to 5.37V,400mW		
Q71	IC,(μPC209C)			
Q72	Not assigned			
Q73	Not assigned			
Q74	Not assigned			
Q75	Di,(1S2210)			
Q76	Di,(1S2210)			
Q77	Di,(1S2210)			
Q78	Di,(1S2210)			
Q79	Di,(1S2210)			
R 1	MF,(RN14K2E1002D)	10.0kΩ,±0.5%,1/4W		
R 2	MF,(RN14K2E61R9D)	61.9Ω,±0.5%,1/4W		
R 3	Var,MF, (POT1103H-1-104)	100kΩ,1/4W		
R 4	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W		
R 5	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 6	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 7	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 8	CF,(ARD25T473J)	47kΩ,±5%,1/4W		
R 9	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R10	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R11	Not assigned			
R12	CF,(ARD25T121J)	120Ω,±5%,1/4W		
R13	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W		
R14	CF,(ARD25T224J)	220kΩ,±5%,1/4W		
R15	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W		
R16	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W		
R17	MF,(RN14K2E3922D)	39.2kΩ,±0.5%,1/4W		
R18	MF,(RN14K2E4992D)	49.9kΩ,±0.5%,1/4W		
R19	CF,(ARD25T154J)	150kΩ,±5%,1/4W		
R20	Not assigned			
R21	MF,(RN14K2E1002D)	10.0kΩ,±0.5%,1/4W		
R22	MF,(RN14K2E1002D)	10.0kΩ,±0.5%,1/4W		
R23	MF,(RN14K2E2003D)	200kΩ,±0.5%,1/4W		

( ): Manufacturer's part number
* : Selected at factory

Parts List : AMP (Z11) MH938A/MH939A/MH955A

CKT REF	DESCRIPTION	RATING	NOTE
R24	MF,(RN14K2E2003D)	200kΩ,±0.5%,1/4W	
R25	MF,(RN14K2E3322D)	33.2kΩ,±0.5%,1/4W	
R26	MF,(RN14K2E7500D)	750Ω,±0.5%,1/4W	
R27	Var,MF, (POT1103H-1-503)	50kΩ,1/4W	
R28	CF,(ARD25T154J)	150kΩ,±5%,1/4W	
R29	Var,MF, (POT1103H-1-504)	500kΩ,1/4W	
R30	Var,MF, (POT1103H-1-203)	20kΩ,1/4W	
R31	Not assigned		
R32	Not assigned		
R33	Not assigned		
R34	Not assigned		
R35	MF,(RN14K2E1691D)	1.69kΩ,±0.5%,1/4W	
R36	MF,(RN14K2E7501D)	7.50kΩ,±0.5%,1/4W	
R37	MF,(RN14K2E61R9D)	61.9Ω,±0.5%,1/4W	
R38	Var,MF, (POT1103H-1-104)	100kΩ,1/4W	
R39	MF,(RN14K2E1961D)	1.96kΩ,±0.5%,1/4W	
R40	MF,(RN14K2E1002D)	10.0kΩ,±0.5%,1/4W	
R41	Not assigned		
R42	MF,(RN14K2E61R9D)	61.9Ω,±0.5%,1/4W	
R43	Not assigned		
R44	Not assigned		
R45	Not assigned		
R46	Var,MF, (POT1103H-1-104)	100kΩ,1/4W	
R47	Not assigned		
R48	MF,(RN14K2E4991D)	4.99kΩ,±0.5%,1/4W	
R49	MF,(RN14K2E4991D)	4.99kΩ,±0.5%,1/4W	
R50	MF,(RN14K2E61R9D)	61.9Ω,±0.5%,1/4W	
R51	Not assigned		
R52	Var,MF, (POT1103H-1-104)	100kΩ,1/4W	
R53	MF,(RN14K2E1002D)	10.0kΩ,±0.5%,1/4W	
R54	MF,(RN14K2E1430D)	143Ω,±0.5%,1/4W	
R55	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R56	Var,MF, (POT1103H-1-503)	50kΩ,1/4W	
R57	Var,MF, (POT1103H-1-503)	50kΩ,1/4W	
R58	CF,(ARD25T334J)	330kΩ,±5%,1/4W	
R59	Var,MF, (POT1103H-1-503)	50kΩ,1/4W	

( ): Manufacturer's part number
* : Selected at factory

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Parts List : AMP (Z11) MH938A/MH939A/MH955A

CKT REF	DESCRIPTION	RATING	NOTE
R60	MF,(RN14K2E1002D)	10.0kΩ,±0.5%,1/4W	
R61	Not assigned		
R62	Var,MF, (POT1103H-1-502)	5kΩ,1/4W	
R63	MF,(RN14K2E1782D)	17.8kΩ,±0.5%,1/4W	
R64	Not assigned		
R65	Not assigned		
R66	Not assigned		
R67	Not assigned		
R68	MF,(RN14K2E2150D)	215Ω,±0.5%,1/4W	
R69	MF,(RN14K2E2870D)	287Ω,±0.5%,1/4W	
R70	MF,(RN14K2E2870D)	287Ω,±0.5%,1/4W	
R71	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R72	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R73	MF,(RN14K2E7500D)	750Ω,±0.5%,1/4W	
R74	MF,(RN14K2E1820D)	182Ω,±0.5%,1/4W	
R75	MF,(RN14K2E1820D)	182Ω,±0.5%,1/4W	
R76	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R77	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R78	MF,(RN14K2E7500D)	750Ω,±0.5%,1/4W	
R79	MF,(RN14K2E1820D)	182Ω,±0.5%,1/4W	
R80	MF,(RN14K2E1820D)	182Ω,±0.5%,1/4W	
R81	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R82	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R83	MF,(RN14K2E7500D)	750Ω,±0.5%,1/4W	
R84	MF,(RN14K2E1820D)	182Ω,±0.5%,1/4W	
R85	MF,(RN14K2E1820D)	182Ω,±0.5%,1/4W	
R86	MF,(RN14K2E1500D)	150Ω,±0.5%,1/4W	
R87	MF,(RN14K2E1500D)	150Ω,±0.5%,1/4W	
R88	Not assigned		
R89	MF,(RN14K2E43R2D)	43.2Ω,±0.5%,1/4W	
R90	MF,(RN14K2E43R2D)	43.2Ω,±0.5%,1/4W	
R91	Not assigned		
R92	MF,(RN14K2E1820D)	182Ω,±0.5%,1/4W	
R93	MF,(RN14K2E51R1D)	51.1Ω,±0.5%,1/4W	
R94	MF,(RN14K2E51R1D)	51.1Ω,±0.5%,1/4W	
R95	Var,MF, (POT1103H-1-101)	100Ω,1/4W	
R96	MF,(RN14K2E1001D)	1.0kΩ,±0.5%,1/4W	
R97	MF,(RN14K2E1001D)	1.0kΩ,±0.5%,1/4W	
R98	MF,(RN14K2E3650D)	365Ω,±0.5%,1/4W	
R99	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R100	Not assigned		
R101	Not assigned		
R102	Not assigned		

( ): Manufacturer's part number
* : Selected at factory

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Parts List : AMP (Z11) MH938A/MH939A/MH955A

CKT REF	DESCRIPTION	RATING	NOTE
R103	MF,(RN14K2E5900D)	590Ω,±0.5%,1/4W	
R104	MF,(RN14K2E51R1D)	51.1Ω,±0.5%,1/4W	
R105	MF,(RN14K2E51R1D)	51.1Ω,±0.5%,1/4W	
R106	Var,MF, (POT1103H-1-101)	100Ω,1/4W	
R107	MF,(RN14K2E1001D)	1.0kΩ,±0.5%,1/4W	
R108	MF,(RN14K2E2151D)	2.15kΩ,±0.5%,1/4W	
R109	MF,(RN14K2E1781D)	1.78kΩ,±0.5%,1/4W	
R110	Not assigned		
R111	MF,(RN14K2E1501D)	1.50kΩ,±0.5%,1/4W	
R112	Not assigned		
R113	MF,(RN14K2E16R9D)	16.9Ω,±0.5%,1/4W	
R114	MF,(RN14K2E16R9D)	16.9Ω,±0.5%,1/4W	
R115	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R116	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R117	MF,(RN14K2E1330D)	133Ω,±0.5%,1/4W	
R118	MF,(RN14K2E1330D)	133Ω,±0.5%,1/4W	
R119	Var,MF, (POT1103H-1-101)	100Ω,1/4W	
R120	Not assigned		
R121	MF,(RN14K2E7500D)	750Ω,±0.5%,1/4W	
R122	MF,(RN14K2E7500D)	750Ω,±0.5%,1/4W	
R123	MF,(RN14K2E8061D)	8.06kΩ,±0.5%,1/4W	
R124	MF,(RN14K2E8061D)	8.06kΩ,±0.5%,1/4W	
R125	MF,(RN14K2E2001D)	2.00kΩ,±0.5%,1/4W	
R126	MF,(RN14K2E6340D)	634Ω,±0.5%,1/4W	
R127	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R128	MF,(RN14K2E1430D)	143Ω,±0.5%,1/4W	
R129	MF,(RN14K2E1430D)	143Ω,±0.5%,1/4W	
R130	Not assigned		
R131	MF,(RN14K2E5110D)	511Ω,±0.5%,1/4W	
R132	MF,(RN14K2E5110D)	511Ω,±0.5%,1/4W	
R133	MF,(RN14K2E3741D)	3.74kΩ,±0.5%,1/4W	
R134	MF,(RN14K2E6190D)	619Ω,±0.5%,1/4W	
R135	MF,(RN14K2E4021D)	4.02kΩ,±0.5%,1/4W	
R136	MF,(RN14K2E2150D)	215Ω,±0.5%,1/4W	
R137	MF,(RN14K2E2871D)	2.87kΩ,±0.5%,1/4W	
R138	MF,(RN14K2E2001D)	2.00kΩ,±0.5%,1/4W	
R139	Var,MF, (POT1103H-1-101)	100kΩ,1/4W	
R140	Not assigned		
R141	Not assigned		
R142	MF,(RN14K2E43R2D)	43.2Ω,±0.5%,1/4W	
R143	MF,(RN14K2E43R2D)	43.2Ω,±0.5%,1/4W	

( ): Manufacturer's part number
* : Selected at factory

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Parts List : AMP (Z11) MH938A/MH939A/MH955A

CKT REF	DESCRIPTION	RATING	NOTE
R144	MF,(RN14K2E1501D)	1.50kΩ,±0.5%,1/4W	
R145	MF,(RN14K2E1501D)	1.50kΩ,±0.5%,1/4W	
R146	MF,(RN14K2E1911D)	1.91kΩ,±0.5%,1/4W	
R147	MF,(RN14K2E1911D)	1.91kΩ,±0.5%,1/4W	
R148	MF,(RN14K2E1400D)	140Ω,±0.5%,1/4W	
R149	MF,(RN14K2E1400D)	140Ω,±0.5%,1/4W	
R150	MF,(RN14K2E1400D)	140Ω,±0.5%,1/4W	
R151	MF,(RN14K2E1400D)	140Ω,±0.5%,1/4W	
R152	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R153	MF,(RN14K2E2670D)	267Ω,±0.5%,1/4W	
R154	MF,(RN14K2E10R0D)	10.0Ω,±0.5%,1/4W	
R155	MF,(RN14K2D1580D)	158Ω,±0.5%,1/4W	
R156	MF,(RN14K2E6812D)	68.1kΩ,±0.5%,1/4W	
R157	MF,(RN14K2E6812D)	68.1kΩ,±0.5%,1/4W	
R158	Not assigned		
R159	Not assigned		
R160	Not assigned		
R161	Not assigned		
R162	MF,(RN14K2E2370D)	237Ω,±0.5%,1/4W	
R163	Not assigned		
R164	Not assigned		
R165	Var,MF,(POT1103H-1-501)	500Ω,1/4W	
R166	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R167	MF,(RN14K2E43R2D)	43.2Ω,±0.5%,1/4W	
R168	MF,(RN14K2E1211D)	1.21kΩ,±0.5%,1/4W	
R169	MF,(RN14K2E2211D)	2.21kΩ,±0.5%,1/4W	
R170	MF,(RN14K2E2670D)	267Ω,±0.5%,1/4W	
R171	Not assigned		
R172	Not assigned		
R173	MF,(RN14K2E1692D)	16.9kΩ,±0.5%,1/4W	
R174	MF,(RN14K2E4221D)	4.22kΩ,±0.5%,1/4W	
R175	MF,(RN14K2E2672D)	26.7kΩ,±0.5%,1/4W	
R176	MF,(RN14K2E2151D)	2.15kΩ,±0.5%,1/4W	
R177	MF,(RN14K2E1302D)	13.0kΩ,±0.5%,1/4W	
R178	MF,(RN14K2E6041D)	6.04kΩ,±0.5%,1/4W	
R179	MF,(RN14K2E4750D)	475Ω,±0.5%,1/4W	
R180	Var,MF,(POT1103H-1-203)	20kΩ,1/4W	
R181	Not assigned		
R182	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R183	MF,(FN14K2E3241D)	3.24kΩ,±0.5%,1/4W	
R184	MF,(RN14K2E1821D)	1.82kΩ,±0.5%,1/4W	
R185	MF,(RN14K2E5491D)	5.49kΩ,±0.5%,1/4W	
R186	Var,MF,(POT1103H-1-501)	500Ω,1/4W	
R187	Var,MF,(POT1103H-1-102)	1kΩ,1/4W	
R188	MF,(RN14K2E43R2D)	43.2Ω,±0.5%,1/4W	

( ): Manufacturer's part number
* : Selected at factory

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Parts List : AMP (Z11) MH938A/MH939A/MH955A

CKT REF	DESCRIPTION	RATING		NOTE
R189	MF,(RN14K2E2001D)	2.00kΩ,±0.5%,1/4W		
R190	MF,(RN14K2E2001D)	2.00kΩ,±0.5%,1/4W		
R191	MF,(RN14K2E43R2D)	43.2Ω,±0.5%,1/4W		
R192	MF,(RN14K2E4641D)	4.64kΩ,±0.5%,1/4W		
R193	Not assigned			
R194	Not assigned			
R195	Not assigned			
R196	Not assigned			
R197	Not assigned			
R198	Not assigned			
R199	MF,(RN14K2E1002D)	10.0k ,±0.5%,1/4W		
R200	Var,MF, (POT1103H-1-503)	50kΩ,1/4W		
R201	Var,MF, (POT1103H-1-503)	50kΩ,1/4W		
R202	Var,MF, (POT1103H-1-503)	50kΩ,1/4W		
R203	MF,(RN14K2E1002D)	10.0kΩ,±0.5%,1/4W		
R204	CF,(ARD25T105J)	1.0MΩ,±5%,1/4W		
R205	MF,(RN14K2E1961D)	1.96kΩ,±0.5%,1/4W		
R206	Not assigned			
R207	Not assigned			
R208	Not assigned			
R209	Not assigned			
R210	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R211	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R212	CF,(ARD25T681J)	680Ω,±5%,1/4W		
S 1	Connector Switch (FFC-3AMEP)			
S 2	Connector Switch (FFC-3AMEP)			
S 3	Not assigned			
S 4	Connector Switch (FFC-2AMEP)			
S 5	Connector Switch (FFC-3AMEP)			

( ): Manufacturer's part number
* : Selected at factory

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Parts List : Optical Connector Sensor (Z13)

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Cer,(CC924F1H104Z)	0.1μF,+80/-20%,50V		
J 1	Plug,(DF1-3P2.5DSA)	3P		
Q 1	IC,(74HC00F)			
Q 2	LED,(SE302A)			
Q 3	Photo Tr,(PH101)			
R 1	CF,(ERD10TJ683A)	68kΩ,±5%,1/8W		
R 2	CF,(ERD10TJ683A)	68kΩ,±5%,1/8W		
R 3	CF,(ERD10TJ390A)	39Ω,±5%,1/8W		
R 4	CF,(ERD10TJ151A)	150Ω,±5%,1/8W		
R 5	Var,MF, (POT1103-1-201)	200Ω,1/4W		
S 1	Toggle,(SM134SK)			
U 1	PC board,(W42U944)			
U 2	PC board,(W42U944)			

( ): Manufacturer's part number
* : Selected at factory

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Parts List : Motherboard (Z16) MH937A

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Not assigned			
C 2	Not assigned			
C 3	Not assigned			
C 4	Not assigned			
C 5	Not assigned			
C 6	Not assigned			
C 7	Not assigned			
C 8	Not assigned			
C 9	Not assigned			
C10	Not assigned			
C11	Cer,(CC924CH1H681J)	680pF,±5%,50V		
C12	Cer,(CC924CH1H360J)	36pF,±5%,50V		
C13	Cer,(CC924CH1H151J)	150pF,±5%,50V		
C14	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C15	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C16	Cer,(CC924CH1H391J)	390pF,±5%,50V		
C17	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C18	Cer,(CC924CH1H561J)	560pF,±5%,50V		
C19	Cer,(CC924CH1H151J)	150pF,±5%,50V		
C20	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C21	Cer,(CC924CH1H271J)	270pF,±5%,50V		
C22	Cer,(CC924CH1H271J)	270pF,±5%,50V		
C23	Not assigned			
C24	Not assigned			
C25	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C26	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C27	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C28	Not assigned			
C29	Not assigned			
C30	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C31	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C32	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C33	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C34	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C35	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C36	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C37	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C38	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C39	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C40	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C41	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C42	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C43	Not assigned			
C44	Not assigned			
C45	Elect,(SRA10VB-100(M))	100μF,±20%,10V		

( ): Manufacturer's part number
* : Selected at factory

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Parts List : Motherboard (Z16) MH937A

CKT REF	DESCRIPTION	RATING		NOTE
C46	Elect,(SRA16VB-47(M))	47μF,±20%,16V		
C47	Elect,(SRA16VB-47(M))	47μF,±20%,16V		
C48	Elect,(SRA16VB-47(M))	47μF,±20%,16V		
C49	Elect,(SRA10VB-100(M))	100μF,±20%,10V		
C50	Elect,(SRA16VB-100(M))	100μF,±20%,16V		
C51	Elect,(SRA25VB-47(M))	47μF,±20%,25V		
C52	Elect,(SRA25VB-47(M))	47μF,±20%,25V		
C53	Elect,(SRA16VB-47(M))	47μF,±20%,16V		
C54	Elect,(SRA16VB-47(M))	47μF,±20%,16V		
C55	Not assginged			
C56	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C57	Elect,(SRA10VB-100(M))	100μF,±20%,10V		
C58	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C59	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C60	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C61	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C62	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C63	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C64	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C65	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C66	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C67	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C68	Cer,(CK624F1H104Z)	0.1μF,+80/-20%,50V		
C69	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C70	Cer,(CC924CH1H330J)	33pF,±5%,50V		
C71	Cer,(CC924CH1H330J)	33pF,±5%,50V		
C72	Cer,(CC924CH1H330J)	33pF,±5%,50V		
C73	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C74	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C75	Cer,(CC924CH1H271J)	270pF,±5%,50V		
C76	Cer,(CC924CH1H271J)	270pF,±5%,50V		
C77	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C78	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C79	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C80	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C81	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C82	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C83	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C84	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C85	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C86 to C97	Not assigned Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		

( ): Manufacturer's part number
* : Selected at factory

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Parts List : Motherboard (Z16) MH937A

CKT REF	DESCRIPTION	RATING		NOTE
J 1	Connector, (PCN10-96P-2.54DS)	96P		
J 2	Connector, (HIF6B-40DA-1.27DSA)			
J 3	Connector, (DF1-10P2.5DS)	10P		
J 4	Connector, (DF1-8P2.5DS)	8P		
J 5	Connector, (DF1-3P2.5DSA)	3P		
J 6	Connector, (DF1-8P2.5DSA)	8P		
J 7	Connector, (DF1-5P2.5DS)	5P		
J 8	Connector, (DF1-8P2.5DSA)	8P		
J 9	Not assigned			
J10	Plug,(27DP-LR-PC)			
K 1	Not assigned			
K 2	Relay,(LAD1018C)			
Q 1	IC,(74HC245)			
Q 2	IC,(74HC240)			
Q 3	IC,(74HC139)			
Q 4	IC,(74HC273)			
Q 5	IC,(74HC273)			
Q 6	Not assigned			
Q 7	IC,(74HC32)			
Q 8	Not assigned			
Q 9	Not assigned			
Q10	Not assigned			
Q11	IC,(74HC138)			
Q12	IC,(74HC04)			
Q13	IC,(74HC04)			
Q14	IC,(74LS221)			
Q15	IC,(74LS221)			
Q16	IC,(74LS221)			
Q17	IC,(74LS123)			
Q18	IC,(74LS123)			
Q19	IC,(74LS74)			
Q20	IC,(74LS221)			
Q21	Not assigned			
Q22	Not assigned			

( ): Manufacturer's part number
* : Selected at factory

Parts List : Motherboard (Z16) MH937A

CKT REF	DESCRIPTION	RATING		NOTE
Q23	IC,(74LS10)			
Q24	IC,(74LS30)			
Q25	IC,(74LS221)			
Q26	Not assigned			
Q27	IC,(74LS27)			
Q28	Not assigned			
Q29	Not assigned			
Q30	Not assigned			
Q31	IC,(74HC123)			
Q32	Di,(1SS99)			
Q33	Di,(1SS99)			
Q34	IC,(74HC04)			
Q35	IC,(74LS05)			
Q36	Not assigned			
Q37	IC,(PS2007B)			
Q38	IC,(PS2007B)			
Q39	IC,(PS2007B)			
Q40	IC,(PS2007B)			
Q41	IC,(PS2401-3)			
Q42	IC,(PS2401-4)			
Q43	IC,(PS2401-4)			
Q44	IC,(74LS05)			
Q45	IC,(74HC244)			
Q46	IC,(7407)			
Q47	IC,(74LS05)			
Q48	Not assigned			
Q49	Not assigned			
Q50	Not assigned			
Q51	Tr,(2SC2901)			
Q52	Tr,(2SC2901)			
Q53	Tr,(2SC1216)			
Q54	Tr,(2SC1216)			
Q55	Tr,(2SC1216)			
Q56	Tr,(2SC1280AS)			
Q57	Tr,(2SC1280AS)			
Q58	Tr,(2SC1008)			
Q59	Not assigned			
Q60	Not assigned			
Q61	Not assigned			
Q62	IC,(μPC16312H)			
Q63	IC,(μPC14312H)			
Q64	Di,(1S953)			
Q65	Di,(1S953)			
Q66	LED,(SR615D)			
Q67	IC,(μPC78L08)			

( ): Manufacturer's part number
* : Selected at factory

Parts List : Motherboard (Z16) MH937A

CKT REF	DESCRIPTION	RATING		NOTE
Q68	Di,(1S953)			
Q69	IC,(μPC254D)			
Q70	IC,(PS2007B)			
Q71	IC,(74HC74)			
Q72	Not assigned			
Q73	Di,(1S953)			
Q74	Tr,(2SC945)			
Q75	Not assigned			
Q76	Not assigned			
Q77	Not assigned			
Q78	Not assigned			
R 1	Single in-line array, (IHR-8-473JA)	47kΩ x 8,1/8W		
R 2	Not assigned			
R 3	Not assigned			
R 4	Not assigned			
R 5	Not assigned			
R 6	Not assigned			
R 7	Not assigned			
R 8	Not assigned			
R 9	Not assigned			
R10	Not assigned			
R11	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R12	Var,MF, (POT1103B-1-202)	2kΩ,1/4W		
R13	Var,MF, (POT1103B-1-202)	2kΩ,1/4W		
R14	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R15	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R16	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R17	Var,MF, (POT1103B-1-103)	10kΩ,1/4W		
R18	Var,MF, (POT1103B-1-202)	2kΩ,1/4W		
R19	Var,MF, (POT1103B-1-202)	2kΩ,1/4W		
R20	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		

( ): Manufacturer's part number
* : Selected at factory

Parts List : Motherboard (Z16) MH937A

CKT REF	DESCRIPTION	RATING		NOTE
R21	Var,MF, (POT1103B-1-103)	10kΩ,1/4W		
R22	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R23	Not assigned			
R24	MF,(RN14K2E6811D)	6.81kΩ,±0.5%,1/4W		
R25	MF,(RN14K2E2001D)	2.00kΩ,±0.5%,1/4W		
R26	MF,(RN14K2E3831D)	3.83kΩ,±0.5%,1/4W		
R27	MF,(RN14K2E6341D)	6.34kΩ,±0.5%,1/4W		
R28	CF,(ARD25T473J)	47kΩ,±5%,1/4W		
R29	Not assigned			
R30	Not assigned			
R31	MF,(RN14K2E8061D)	8.06kΩ,±0.5%,1/4W		
R32	MF,(RN14K2E9311D)	9.31kΩ,±0.5%,1/4W		
R33	MF,(RN14K2E1692D)	16.9kΩ,±0.5%,1/4W		
R34	MF,(RN14K2E3161D)	3.16kΩ,±0.5%,1/4W		
R35	MF,(RN14K2E4221D)	4.22kΩ,±0.5%,1/4W		
R36	MF,(RN14K2E1782D)	17.8kΩ,±0.5%,1/4W		
R37	MF,(RN14K2E8251D)	8.25kΩ,±0.5%,1/4W		
R38	MF,(RN14K2E2871D)	2.87kΩ,±0.5%,1/4W		
R39	Not assigned			
R40	Not assigned			
R41	Not assigned			
R42	Not assigned			
R43	Not assigned			
R44	Not assigned			
R45	MF,(RN14K2E9091D)	9.09kΩ,±0.5%,1/4W		
R46	MF,(RN14K2E6491D)	6.49kΩ,±0.5%,1/4W		
R47	MF,(RN14K2E8060D)	806Ω,±0.5%,1/4W		
R48	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W		
R49	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R50	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R51	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R52	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R53	Single-in-line array, (IHR-4-681JA)	680Ω x 4,1/8W		
R54	Single-in-line array, (IHR-4-681JA)	680Ω x 4,1/8W		
R55	Single-in-line array, (IHR-4-681JA)	680Ω x 4,1/8W		
R56	Not assigned			
R57	Not assigned			
R58	Not assigned			
R59	Not assigned			
R60	Not assigned			

( ): Manufacturer's part number
* : Selected at factory

Parts List : Motherboard (Z16) MH937A

CKT REF	DESCRIPTION	RATING		NOTE
R61	MF,(RN14K2E6190D)	619Ω,±0.5%,1/4W		
R62	MF,(RN14K2E6190D)	619Ω,±0.5%,1/4W		
R63	CF,(ARD25T473J)	47kΩ,±5%,1/4W		
R64	MF,(RN14K2E4750D)	475Ω,±0.5%,1/4W		
R65	MF,(RN14K2E4750D)	475Ω,±0.5%,1/4W		
R66	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R67	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R68	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R69	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R70	CF,(ARD25T150J)	15Ω,±5%,1/4W		
R71	MF,(RN14K2E50R0D)	50.0Ω,±0.5%,1/4W		
R72	MF,(RN14K2E2201D)	2.20kΩ,±0.5%,1/4W		
R73	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R74	Var,MF, (POT1103H-1-203)	20kΩ,1/4W		
R75	Not assigned			
R76	Not assigned			
R77	Not assigned			
R78	Not assigned			
R79	Not assigned			
R80	CF,(ARD25T222J)	2.2k[illegible],1/4W		
R81	CF,(ARD25T222J)	2.2k[illegible],1/4W		
R82	Not assigned			
R83	CF,(ARD25T102J)	1.0k[illegible],1/4W		
R84	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W		
R85	MF,(RN14K2E3161D)	3.16kΩ,±0.5%,1/4W		
R86	MF,(RN14K2E10R0D)	10.0Ω,±0.5%,1/4W		
R87	Single-in-line array, (1HR-8-473JA)	47kΩ x 8,1/8W		
R88	Single-in-line array, (1HR-4-473JA)	47kΩ x 4,1/8W		
R89	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R90	Not assigned			
R91	Not assigned			
R92	Not assigned			
R93	CF,(ARD25T391J)	390Ω,±5%,1/4W		
R94	Not assigned			
R95	Not assigned			
R96	Not assigned			
R97	Not assigned			
R98	Not assigned			
R99	Not assigned			
R100	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W		
R101	CF,(ARD25T152J)	1.5k[illegible],±5%,1/4W		
R102	CF,(ARD25T152J)	1.5k[illegible],±5%,1/4W		

( ): Manufacturer's part number
* : Selected at factory

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Parts List : Motherboard (Z16) MH937A

CKT REF	DESCRIPTION	RATING		NOTE
R103	MF,(RN14K2E8251D)	8.25kΩ,±0.5%,1/4W		
R104	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R105	MF,(RN14K2E8251D)	8.25kΩ,±0.5%,1/4W		
R106	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R107	Single in-line array, (1HR-8-473JA)	47kΩ x 8,1/8W		
R108	Single-in-line array, (1HR-8-681JA)	680Ω x 4,1/8W		
R109	Single-in-line array, (1HR-4-821JA)	820Ω x 4,1/8W		
R110	Single-in-line array, (1HR-4-471JA)	470Ω x 4,1/8W		
R111	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R112	Not assigned			
R113	Not assigned			
R114	Not assigned			
R115	Var,MF, (POT1103B-1-102)	1kΩ,1/4W		
R116	CF,(ARD25T472J)	4.7kΩ,+5%,1/4W		
S 1	Dip,(DIP-A(8))	MI		

( ): Manufacturer's part number
* : Selected at factory

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Parts List : Motherboard (Z16) MH938A/MH939A

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Not assigned			
C 2	Not assigned			
C 3	Not assigned			
C 4	Not assigned			
C 5	Not assigned			
C 6	Not assigned			
C 7	Not assigned			
C 8	Not assigned			
C 9	Not assigned			
C10	Not assigned			
C11	Cer,(CC924CH1H681J)	680pF,±5%,50V		
C12	Cer,(CC924CH1H360J)	36pF,±5%,50V		
C13	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C14	Cer,(CC924CH1H681J)	680pF,±5%,50V		
C15	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C16	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C17	Cer,(CC924CH1H681J)	680pF,±5%,50V		
C18	Cer,(CC924CH1H561J)	560pF,±5%,50V		
C19	Cer,(CC924CH1H151J)	150pF,±5%,50V		
C20	Cer,(CC924CH1H271J)	270pF,±5%,50V		
C21	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C22	Cer,(CC924CH1H271J)	270pF,±5%,50V		
C23	Not assigned			
C24	Not assigned			
C25	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C26	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C27	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C28	Not assigned			
C29	Not assigned			
C30	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C31	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C32	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C33	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C34	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C35	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C36	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C37	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C38	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C39	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C40	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C41	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C42	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C43	Not assigned			
C44	Not assigned			
C45	Elect,(SRA10VB-100(M))	100μF,±20%,10V		

( ): Manufacturer's part number
* : Selected at factory

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Parts List : Motherboard (Z16) MH938A/MH939A

CKT REF	DESCRIPTION	RATING		NOTE
C46	Elect,(SRA16VB-47(M))	47μF,±20%,16V		
C47	Elect,(SRA16VB-47(M))	47μF,±20%,16V		
C48	Elect,(SRA16VB-47(M))	47μF,±20%,16V		
C49	Elect,(SRA10VB-100(M))	100μF,±20%,10V		
C50	Elect,(SRA16VB-100(M))	100μF,+20%,16V		
C51	Elect,(SRA25VB-47(M))	47μF,±20%,25V		
C52	Elect,(SRA25VB-47(M))	47μF,±20%,25V		
C53	Elect,(SRA16VB-47(M))	47μF,±20%,16V		
C54	Elect,(SRA16VB-47(M))	47μF,±20%,16V		
C55	Not assigned			
C56	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C57	Elect,(SRA10VB-100(M))	100μF,±20%,10V		
C58 to C69	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C70	Cer,(CC924CH1H330J)	33pF,±5%,50V		
C71	Cer,(CC924CH1H330J)	33pF,±5%,50V		
C72	Cer,(CC924CH1H330J)	33pF,±5%,50V		
C73	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C74	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C75	Cer,(CC924CH1H271J)	270pF,±5%,50V		
C76	Cer,(CC924CH1H271J)	270pF,±5%,50V		
C77	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C78	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C79 to C97	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
J 1	Connector, (PCN10-96P-2.54DS)	96P		
J 2	Connector, (HIF6B-40DA-1.27DSA)			
J 3	Connector, (DF1-10P2.5DS)	10P		
J 4	Connector, (DF1-8P2.5DS)	8P		
J 5	Connector, (DF1-3P2.5DSA)	3P		
J 6	Connector, (DF1-8P2.5DSA)	8P		
J 7	Connector, (DF1-5P2.5DS)	5P		
J 8	Connector, (DF1-8P2.5DSA)	8P		

( ): Manufacturer's part number
* : Selected at factory

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Parts List : Motherboard (Z16) MH938A/MH939A

CKT REF	DESCRIPTION	RATING	NOTE
J 9	Not assigned		
J10	Connector,(27DP-LR-PC)		
K 1	Not assigned		
K 2	Relay,(LAD1018C)		
Q 1	IC,(74HC245)		
Q 2	IC,(74HC240)		
Q 3	IC,(74HC139)		
Q 4	IC,(74HC273)		
Q 5	IC,(74HC273)		
Q 6	Not assigned		
Q 7	IC,(74HC32)		
Q 8	Not assigned		
Q 9	Not assigned		
Q10	Not assigned		
Q11	IC,(74HC138)		
Q12	IC,(74HC04)		
Q13	IC,(74HC04)		
Q14	IC,(74LS221)		
Q15	IC,(74LS221)		
Q16	IC,(74LS221)		
Q17	IC,(74LS123)		
Q18	IC,(74LS123)		
Q19	IC,(74LS74)		
Q20	IC,(74LS221)		
Q21	Not assigned		
Q22	Not assigned		
Q23	IC,(74LS10)		
Q24	IC,(74LS30)		
Q25	IC,(74LS221)		
Q26	Not assigned		
Q27	IC,(74LS27)		
Q28	Not assigned		
Q29	Not assigned		
Q30	Not assigned		
Q31	IC,(74HC123)		
Q32	Di,(1SS99)		
Q33	Di,(1SS99)		
Q34	IC,(74HC04)		
Q35	IC,(74LS05)		
Q36	Not assigned		
Q37	IC,(PS2007B)		

( ): Manufacturer's part number
* : Selected at factory

Parts List : Motherboard (Z16) MH938A/MH939A

CKT REF	DESCRIPTION	RATING	NOTE
Q38	IC,(PS2007B)		
Q39	IC,(PS2007B)		
Q40	IC,(PS2007B)		
Q41	IC,(PS2401-3)		
Q42	IC,(PS2401-4)		
Q43	IC,(PS2401-4)		
Q44	IC,(74LS05)		
Q45	IC,(74HC244)		
Q46	IC,(7407)		
Q47	IC,(74LS05)		
Q48	Not assigned		
Q49	Not assigned		
Q50	Not assigned		
Q51	Tr,(2SC2901)		
Q52	Tr,(2SC2901)		
Q53	Tr,(2SC1216)		
Q54	Tr,(2SC1216)		
Q55	Tr,(2SC1216)		
Q56	Tr,(2SC1280AS)		
Q57	Tr,(2SC1280AS)		
Q58	Tr,(2SC1008)		
Q59	Not assigned		
Q60	Not assigned		
Q61	Not assigned		
Q62	IC,(μPC16312H)		
Q63	IC,(μPC14312H)		
Q64	Di,(1S953)		
Q65	Di,(1S953)		
Q66	LED,(SR615D)		
Q67	IC,(μPC78L08)		
Q68	Di,(1S953)		
Q69	IC,(μPC254D)		
Q70	IC,(PS2007B)		
Q71	IC,(74HC74)		
Q72	Not assigned		
Q73	Di,(1S953)		
Q74	Tr,(2SC945)		
Q75	Not assigned		
Q76	Not assigned		
Q77	Not assigned		
Q78	Not assigned		
R 1	Single-in-line array, (IHR-8-473JA)	47kΩ x 8,1/8W	

( ): Manufacturer's part number
* : Selected at factory

Parts List : Motherboard (Z16) MH938A/MH939A

CKT REF	DESCRIPTION	RATING	NOTE
R 2	Not assigned		
R 3	Not assigned		
R 4	Not assigned		
R 5	Not assigned		
R 6	Not assigned		
R 7	Not assigned		
R 8	Not assigned		
R 9	Not assigned		
R10	Not assigned		
R11	Var,MF, (POT1103B-1-502)	50kΩ,1/4W	
R12	Var,MF, (POT1103B-1-202)	2kΩ,1/4W	
R13	Var,MF, (POT1103B-1-202)	2kΩ,1/4W	
R14	Var,MF, (POT1103B-1-502)	5kΩ,1/4W	
R15	Var,MF, (POT1103B-1-502)	5kΩ,1/4W	
R16	Var,MF, (POT1103B-1-502)	5kΩ,1/4W	
R17	Var,MF, (POT1103B-1-103)	10kΩ,1/4W	
R18	Var,MF, (POT1103B-1-202)	2kΩ,1/4W	
R19	Var,MF, (POT1103B-1-202)	2kΩ,1/4W	
R20	Var,MF, (POT1103B-1-502)	5kΩ,1/4W	
R21	Var,MF, (POT1103B-1-103)	10kΩ,1/4W	
R22	Var,MF, (POT1103B-1-502)	5kΩ,1/4W	
R23	Not assigned		
R24	MF,(RN14K2E6811D)	6.81kΩ,±0.5%,1/4W	
R25	MF,(RN14K2E2001D)	2.00kΩ,±0.5%,1/4W	
R26	MF,(RN14K2E3481D)	3.48kΩ,±0.5%,1/4W	
R27	MF,(RN14K2E6041D)	6.04kΩ,±0.5%,1/4W	
R28	CF,(ARD25T473J)	47kΩ,±5%,1/4W	
R29	Not assigned		
R30	Not assigned		
R31	MF,(RN14K2E8061D)	8.06kΩ,±0.5%,1/4W	
R32	MF,(RN14K2E7681D)	7.68kΩ,±0.5%,1/4W	
R33	MF,(RN14K2E1622D)	16.2kΩ,±0.5%,1/4W	
R34	MF,(RN14K2E3161D)	3.16kΩ,±0.5%,1/4W	
R35	MF,(RN14K2E7871D)	7.87kΩ,±0.5%,1/4W	

( ): Manufacturer's part number
* : Selected at factory

Parts List : Motherboard (Z16) MH938A/MH939A

CKT REF	DESCRIPTION	RATING	NOTE
R36	MF,(RN14K2E1582D)	15.8kΩ,±0.5%,1/4W	
R37	MF,(RN14K2E8251D)	8.25kΩ,±0.5%,1/4W	
R38	MF,(RN14K2E2871D)	2.87kΩ,±0.5%,1/4W	
R39	Not assigned		
R40	Not assigned		
R41	Not assigned		
R42	Not assigned		
R43	Not assigned		
R44	Not assigned		
R45	MF,(RN14K2E9091D)	9.09kΩ,±0.5%,1/4W	
R46	MF,(RN14K2E6491D)	6.49kΩ,±0.5%,1/4W	
R47	MF,(RN14K2E8060D)	806Ω,±0.5%,1/4W	
R48	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R49	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R50	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R51	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R52	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R53	Single-in-line array, (IHR-4-681JA)	680Ω x 4,1/8W	
R54	Single-in-line array, (IHR-4-681JA)	680Ω x 4,1/8W	
R55	Single-in-line array, (IHR-4-681JA)	680Ω x 4,1/8W	
R56	Not assigned		
R57	Not assigned		
R58	Not assigned		
R59	Not assigned		
R60	Not assigned		
R61	MF,(RN14K2E6190D)	619Ω,±0.5%,1/4W	
R62	MF,(RN14K2E6190D)	619Ω,±0.5%,1/4W	
R63	CF,(ARD25T473J)	47kΩ,±5%,1/4W	
R64	MF,(RN14K2E4750D)	475Ω,±0.5%,1/4W	
R65	MF,(RN14K2E4750D)	475Ω,±0.5%,1/4W	
R66	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R67	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R68	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R69	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R70	CF,(ARD25T150J)	15Ω,±5%,1/4W	
R71	MF,(RN14K2E50R0D)	50.0Ω,±0.5%,1/4W	
R72	MF,(RN14K2E2201D)	2.20kΩ,±0.5%,1/4W	
R73	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R74	Var,MF, (POT1103H-1-203)	20kΩ,1/4W	
R75	Not assigned		
R76	Not assigned		

( ): Manufacturer's part number
* : Selected at factory

Parts List : Motherboard (Z16) MH938A/MH939A

CKT REF	DESCRIPTION	RATING		NOTE
R77	Not assigned			
R78	Not assigned			
R79	Not assigned			
R80	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R81	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R82	Not assigned			
R83	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W		
R84	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W		
R85	MF,(RN14K2E3161D)	3.16kΩ,±0.5%,1/4W		
R86	MF,(RN14K2E10R0D)	10.0Ω,±0.5%,1/4W		
R87	Single-in-line array, (IHR-8-473JA)	47kΩ x 8,1/8W		
R88	Single-in-line array, (IHR-4-473JA)	47kΩ x 4,1/8W		
R89	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R90	Not assigned			
R91	Not assigned			
R92	Not assigned			
R93	CF,(ARD25T391J)	390Ω,±5%,1/4W		
R94	Not assigned			
R95	Not assigned			
R96	Not assigned			
R97	Not assigned			
R98	Not assigned			
R99	Not assigned			
R100	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W		
R101	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W		
R102	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W		
R103	MF,(RN14K2E8251D)	8.25kΩ,±0.5%,1/4W		
R104	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R105	MF,(RN14K2E8251D)	8.25kΩ,±0.5%,1/4W		
R106	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R107	Single-in-line array, (IHR-8-473JA)	47kΩ x 8,1/8W		
R108	Single-in-line array, (IHR-8-681JA)	680Ω x 8,1/8W		
R109	Single-in-line array, (IHR-4-821JA)	820Ω x 4,1/8W		
R110	Single-in-line array, (IHR-4-471JA)	470Ω x 4,1/8W		
R111	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R112	Not assigned			
R113	Not assigned			

( ): Manufacturer's part number
* : Selected at factory

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Parts List : Motherboard (Z16) MH938A/MH939A

CKT REF	DESCRIPTION	RATING		NOTE
R114	Not assigned			
R115	Var,MF, (POT1103B-1-501)	500Ω,1/4W		
R116	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
S 1	Dip,(DIP-A(8))	8P		

( ): Manufacturer's part number
* : Selected at factory

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Parts List : Motherboard (Z16) MH955A

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Not assigned			
C 2	Not assigned			
C 3	Not assigned			
C 4	Not assigned			
C 5	Not assigned			
C 6	Not assigned			
C 7	Not assigned			
C 8	Not assigned			
C 9	Not assigned			
C10	Not assigned			
C11	Cer,(CC924CH1H681J)	680pF,±5%,50V		
C12	Cer,(CC924CH1H360J)	36pF,±5%,50V		
C13	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C14	Cer,(CC924CH1H681J)	680pF,±5%,50V		
C15	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C16	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C17	Cer,(CC924CH1H681J)	680pF,±5%,50V		
C18	Cer,(CC924CH1H561J)	560pF,±5%,50V		
C19	Cer,(CC924CH1H151J)	150pF,±5%,50V		
C20	Cer,(CC924CH1H271J)	270pF,±5%,50V		
C21	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C22	Cer,(CC924CH1H271J)	270pF,±5%,50V		
C23	Not assigned			
C24	Not assigned			
C25	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C26	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C27	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C28	Not assigned			
C29	Not assigned			
C30	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C31	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C32	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C33	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C34	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C35	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C36	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C37	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C38	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C39	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C40	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C41	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C42	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C43	Not assigned			
C44	Not assigned			
C45	Elect,(SRA10VB-100(M))	100μF,±20%,10V		

( ): Manufacturer's part number
* : Selected at factory

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Parts List : Motherboard (Z16) MH955A

CKT REF	DESCRIPTION	RATING		NOTE
C46	Elect,(SRA16VB-47(M))	47μF,±20%,16V		
C47	Elect,(SRA16VB-47(M))	47μF,±20%,16V		
C48	Elect,(SRA16VB-47(M))	47μF,±20%,16V		
C49	Elect,(SRA10VB-100(M))	100μF,±20%,10V		
C50	Elect,(SRA16VB-100(M))	100μF,±20%,16V		
C51	Elect,(SRA25VB-47(M))	47μF,±20%,25V		
C52	Elect,(SRA25VB-47(M))	47μF,±20%,25V		
C53	Elect,(SRA16VB-47(M))	47μF,±20%,16V		
C54	Elect,(SRA16VB-47(M))	47μF,±20%,16V		
C55	Not assigned			
C56	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C57	Elect,(SRA10VB-100(M))	100μF,±20%,10V		
C58 to C69	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C70	Cer,(CC924CH1H330J)	33pF,±5%,50V		
C71	Cer,(CC924CH1H330J)	33pF,±5%,50V		
C72	Cer,(CC924CH1H330J)	33pF,±5%,50V		
C73	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C74	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C75	Cer,(CC924CH1H271J)	270pF,±5%,50V		
C76	Cer,(CC924CH1H271J)	270pF,±5%,50V		
C77	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C78	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C79 to C97	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
J 1	Connector, (PCN10-96P-2.54DS)	96P		
J 2	Connector, (HIF6B-40DA-1.27DSA)			
J 3	Connector, (DF1-10P2.5DS)	10P		
J 4	Connector, (DF1-8P2.5DS)	8P		
J 5	Connector, (DF1-3P2.5DSA)	3P		
J 6	Connector, (DF1-8P2.5DSA)	8P		
J 7	Connector, (DF1-5P2.5DS)	5P		
J 8	Connector, (DF1-8P2.5DSA)	8P		
J 9	Connector, (DF1-8P2.5DS)	8P		

( ): Manufacturer's part number
* : Selected at factory

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Parts List : Motherboard (Z16) MH955A

CKT REF	DESCRIPTION	RATING		NOTE
J10	Plug,(27DP-LR-PC)			
K 1	Relay, (NC2D-JP-DC12V)			
K 2	Relay,(LAD1018C)			
Q 1	IC,(74HC245)			
Q 2	IC,(74HC240)			
Q 3	IC,(74HC139)			
Q 4	IC,(74HC273)			
Q 5	IC,(74HC273)			
Q 6	IC,(74HC273)			
Q 7	IC,(74HC32)			
Q 8	Not assigned			
Q 9	Not assigned			
Q10	Not assigned			
Q11	IC,(74HC138)			
Q12	IC,(74HC04)			
Q13	IC,(74HC04)			
Q14	IC,(74LS221)			
Q15	IC,(74LS221)			
Q16	IC,(74LS221)			
Q17	IC,(74LS123)			
Q18	IC,(74LS123)			
Q19	IC,(74LS74)			
Q20	IC,(74LS221)			
Q21	Not assigned			
Q22	Not assigned			
Q23	IC,(74LS10)			
Q24	IC,(74LS30)			
Q25	IC,(74LS221)			
Q26	Not assigned			
Q27	IC,(74LS27)			
Q28	Not assigned			
Q29	Not assigned			
Q30	Not assigned			
Q31	IC,(74HC123)			
Q32	Di,(1SS99)			
Q33	Di,(1SS99)			
Q34	IC,(74HC04)			
Q35	IC,(74LS05)			
Q36	Not assigned			
Q37	IC,(PS2007B)			

( ): Manufacturer's part number
* : Selected at factory

Parts List : Motherboard (Z16) MH955A

CKT REF	DESCRIPTION	RATING		NOTE
Q38	IC,(PS2007B)			
Q39	IC,(PS2007B)			
Q40	IC,(PS2007B)			
Q41	IC,(PS2401-3)			
Q42	IC,(PS2401-4)			
Q43	IC,(PS2401-4)			
Q44	IC,(74LS05)			
Q45	IC,(74HC244)			
Q46	IC,(7407)			
Q47	IC,(74LS05)			
Q48	Not assigned			
Q49	Not assigned			
Q50	Not assigned			
Q51	Tr,(2SC2901)			
Q52	Tr,(2SC2901)			
Q53	Tr,(2SC1216)			
Q54	Tr,(2SC1216)			
Q55	Tr,(2SC1216)			
Q56	Tr,(2SC1280AS)			
Q57	Tr,(2SC1280AS)			
Q58	Tr,(2SC1008)			
Q59	Not assigned			
Q60	Not assigned			
Q61	Not assigned			
Q62	IC,(μPC16312H)			
Q63	IC,(μPC14312H)			
Q64	Di,(1S953)			
Q65	Di,(1S953)			
Q66	LED,(SR615D)			
Q67	IC,(μPC78L08)			
Q68	Di,(1S953)			
Q69	IC,(μPC254D)			
Q70	IC,(PS2007B)			
Q71	IC,(74HC74)			
Q72	Tr,(2SC945)			
Q73	Di,(1S953)			
Q74	Tr,(2SC945)			
Q75	Not assigned			
Q76	Not assigned			
Q77	Not assigned			
Q78	Di,(1S953)			
R 1	Single-in-line array, (IHR-8-473JA)	47kΩ x 8,1/8W		

( ): Manufacturer's part number
* : Selected at factory

Parts List : Motherboard (Z16) MH955A

CKT REF	DESCRIPTION	RATING		NOTE
R 2	Not assigned			
R 3	Not assigned			
R 4	Not assigned			
R 5	Not assigned			
R 6	Not assigned			
R 7	Not assigned			
R 8	Not assigned			
R 9	Not assigned			
R10	Not assigned			
R11	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R12	Var,MF, (POT1103B-1-202)	2kΩ,1/4W		
R13	Var,MF, (POT1103B-1-202)	2kΩ,1/4W		
R14	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R15	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R16	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R17	Var,MF, (POT1103B-1-103)	10kΩ,1/4W		
R18	Var,MF, (POT1103B-1-202)	2kΩ,1/4W		
R19	Var,MF, (POT1103B-1-202)	2kΩ,1/4W		
R20	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R21	Var,MF, (POT1103B-1-103)	10kΩ,1/4W		
R22	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R23	Not assigned			
R24	MF,(RN14K2E6811D)	6.81kΩ,±0.5%,1/4W		
R25	MF,(RN14K2E2001D)	2.00kΩ,±0.5%,1/4W		
R26	MF,(RN14K2E3481D)	3.48kΩ,±0.5%,1/4W		
R27	MF,(RN14K2E6041D)	6.04kΩ,±0.5%,1/4W		
R28	CF,(ARD25T473J)	47kΩ,±5%,1/4W		
R29	Not assigned			
R30	Not assigned			
R31	MF,(RN14K2E8061D)	8.06kΩ,±0.5%,1/4W		
R32	MF,(RN14K2E7681D)	7.68kΩ,±0.5%,1/4W		
R33	MF,(RN14K2E1622D)	16.2kΩ,±0.5%,1/4W		
R34	MF,(RN14K2E3161D)	3.16kΩ,±0.5%,1/4W		
R35	MF,(RN14K2E7871D)	7.87kΩ,±0.5%,1/4W		

( ): Manufacturer's part number
* : Selected at factory

Parts List : Motherboard (Z16) MH955A

CKT REF	DESCRIPTION	RATING		NOTE
R36	MF,(RN14K2E1582D)	15.8kΩ,±0.5%,1/4W		
R37	MF,(RN14K2E8251D)	8.25kΩ,±0.5%,1/4W		
R38	MF,(RN14K2E2871D)	2.87kΩ,±0.5%,1/4W		
R39	Not assigned			
R40	Not assigned			
R41	Not assigned			
R42	Not assigned			
R43	Not assigned			
R44	Not assigned			
R45	MF,(RN14K2E9091D)	9.09kΩ,±0.5%,1/4W		
R46	MF,(RN14K2E6491D)	6.49kΩ,±0.5%,1/4W		
R47	MF,(RN14K2E8060D)	806Ω,±0.5%,1/4W		
R48	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W		
R49	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R50	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R51	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R52	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R53	Single-in-line array, (IHR-4-681JA)	680Ω x 4,1/8W		
R54	Single-in-line array, (IHR-4-681JA)	680Ω x 4,1/8W		
R55	Single-in-line array, (IHR-4-681JA)	680Ω x 4,1/8W		
R56	Not assigned			
R57	CF,(ARD25T182J)	1.8kΩ,±5%,1/4W		
R58	Not assigned			
R59	Not assigned			
R60	Not assigned			
R61	MF,(RN14K2E6190D)	619Ω,±0.5%,1/4W		
R62	MF,(RN14K2E6190D)	619Ω,±0.5%,1/4W		
R63	CF,(ARD25T473J)	47kΩ,±5%,1/4W		
R64	MF,(RN14K2E4750D)	475Ω,±0.5%,1/4W		
R65	MF,(RN14K2E4750D)	475Ω,±0.5%,1/4W		
R66	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R67	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R68	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R69	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R70	CF,(ARD25T150J)	15Ω,±5%,1/4W		
R71	MF,(RN14K2E50R0D)	50.0Ω,±0.5%,1/4W		
R72	MF,(RN14K2E2201D)	2.20kΩ,±0.5%,1/4W		
R73	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R74	Var,MF, (POT1103H-1-203)	20kΩ,1/4W		
R75	Not assigned			
R76	Not assigned			

( ): Manufacturer's part number
* : Selected at factory

Parts List : Motherboard (Z16) MH955A

CKT REF	DESCRIPTION	RATING		NOTE
R77	Not assigned			
R78	Not assigned			
R79	Not assigned			
R80	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R81	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R82	Not assigned			
R83	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W		
R84	CF,(ARD25T102J)	1.0kΩ,±5%,1/4W		
R85	CF,(RN14K2E3161D)	3.16kΩ,±0.5%,1/4W		
R86	CF,(RN14K2E10R0D)	1.0kΩ,0.5%,1/4W		
R87	Single-in-line array, (IHR-8-473JA)	47kΩ x 8,1/8W		
R88	Single-in-line array, (IHR-4-473JA)	47kΩ x 4,1/8W		
R89	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R90	CF,(ARD25T100J)	10Ω,±5%,1/4W		
R91	Not assigned			
R92	Not assigned			
R93	CF,(ARD25T391J)	390Ω,±5%,1/4W		
R94	Not assigned			
R95	Not assigned			
R96	Not assigned			
R97	Not assigned			
R98	Not assigned			
R99	Not assigned			
R100	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W		*
R101	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W		
R102	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W		
R103	MF,(RN14K2E8251D)	8.25kΩ,±0.5%,1/4W		
R104	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R105	MF,(RN14K2E8251D)	8.25kΩ,±0.5%,1/4W		
R106	Var,MF, (POT1103B-1-502)	5kΩ,1/4W		
R107	Single-in-line array, (IHR-8-473JA)	47kΩ x 8,1/8W		
R108	Single-in-line array, (IHR-8-681JA)	680Ω x 8,1/8W		
R109	Single-in-line array, (IHR-4-821JA)	820Ω x 4,1/8W		
R110	Single-in-line array, (IHR-4-471JA)	470Ω x 4,1/8W		
R111	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R112	Not assigned			
R113	Not assigned			

( ): Manufacturer's part number
* : Selected at factory

Parts List : Motherboard (Z16) MH955A

CKT REF	DESCRIPTION	RATING		NOTE
R114	Not assigned			
R115	Var,MF (POT1103B-1-102)	1kΩ,1/4W		
R116	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
S 1	Dip,(DIP-A(8))	8P		

( ): Manufacturer's part number
* : Selected at factory